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HEALTH FOR THE SOLDIER AND SAILOR

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BY

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Adapted in part from their recent work, "How To Live." approved by the Hygiene Reference Board of the Institute. The material on war hygiene has also been approved by military specialists on the Hygiene Reference Board.

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PREFACE

In times of peace a man who is physically defective may "bluff" through his civil work and make a fair showing. In times of war a man must stand the real test, so far as health and vigor are concerned. The stern demands of war brook no compromise or denial. Whether the soldier or sailor prevails in the shock of battle, whether he survives the shock or infection of wounds, whether he maintains his spirit or morale under long strain and hard pounding, depends to a marked degree upon his original physical equipment and upon the way he lives or has lived.

To know how to live so that he may be most efficient physically is quite as necessary to the soldier as to know his technical military duties.

It is not only important for the fighter to have instruction in war hygiene, but it is most desirable that he know these foundation truths about right living, so that he can himself govern his life along healthful lines.

It is for the purpose of giving this needed instruction that this book is

now offered. If in addition to defending his country with arms the soldier or the sailor returns to civil life physically improved by military training, and with higher ideals of health and physical fitness, he will doubly serve himself, his family and his country.

The introductory material of the book, "How to Live," has been included in this volume, as it so adequately states ideals and educational purposes of the Institute and of this little book.

Let us save what we can from the wreck of war and remember that "The greatest wealth is Health."

IRVING FISHER.
EUGENE LYMAN FISK.

INTRODUCTION

THE purpose of the Life Extension Institute embraces the extension of human life, not only as to length, but also, if we may so express it, as to breadth and depth. It endeavors to accomplish this purpose in many ways, but especially through individual hygiene.

Thoroughly carried out, individual hygiene implies high ideals of health, strength, endurance, symmetry, and beauty; it enormously increases our capacity to work, to be happy, and to be useful; it develops, not only the body, but the mind and the heart; it ennobles the man as a whole.

We in America inherit, through centuries of European tradition, the medieval indifference to the human body, often amounting to contempt. This attitude was a natural outgrowth of the theological doctrine that the "flesh is in league with the devil" and so is the enemy of the soul. In the Middle Ages saintliness was often associated with sickliness. Artists, in portraying saints, often

chose as their models pale and emaciated consumptives.

We are beginning to leave this false tradition behind and are working toward the establishment of more wholesome ideals. It is true, for instance, that the man or the woman who is unhealthy is now generally handicapped in opportunities for marriage, which may be considered an index to the ideals of society.

A great health movement is sweeping over the entire world. Hygiene has repudiated the outworn doctrine that mortality is fatality and must exact year after year a fixed and inevitable sacrifice. It aims instead to set free human life by applying modern science. Science, which has revolutionized every other field of human endeavor, is at last revolutionizing the field of health conservation.

The practise of medicine, which for ages has been known as the "healing art," is undergoing a gradual but radical revolution. This is due to the growing realization that an ounce of prevention is worth a pound of cure. As teachers and writers on hygiene, as trainers for college athletes, as advisers for the welfare departments

of large industrial plants, and in many other directions, physicians are finding fields for practising preventive medicine. Even the family physician is in some cases being asked by his patients to keep them well instead of curing them after they have fallen sick.

Furthermore, the preventive methods of modern medicine are being applied by the people themselves, as witness the great vogue to-day of sleeping out of doors; the popularity, not always deserved, of health foods and drinks; the demand for uncontaminated water supplies, certified milk, inspected meat and pure foods generally; the world-wide movement against alcohol, and the legislation to correct wrong conditions of labor and to safeguard the laborer.

Labor itself to-day is being held in honor, and idleness in dishonor. Ideals are being shifted from those of "leisure" to those of "service." Work was once considered simply a curse of the poor. The real gentleman was supposed to be one who was able to live without it. The king, who set the styles, was envied because he did not have to work, but had

innumerable people to do work for him. His ability to work, his efficiency, his endurance, were the last things to which he gave consideration. To-day kings, emperors, presidents and leaders in every field are trying to find out how they can keep in the fittest condition and accomplish the greatest possible amount of work. Even among society women, some kind of work is now becoming popular.

One of the most satisfying tasks for any man or woman to-day is to take part in this movement toward truer ideals of perfect manhood and womanhood. Our American ideals, though improving, are far inferior to those, for instance, of Sweden; and these, in turn, are not yet worthy to be compared with those of ancient Greece, still preserved for our admiration in imperishable marble. With our superior scientific knowledge, our health ideals ought, as a matter of fact, to excel those of any other age. They should not stop with the mere negation of disease, degeneracy, delinquency, and dependency. They should be positive and progressive. They should include the love of a perfect

muscular development, of integrity of mental and moral fiber.

There should be a keen sense of enjoyment of all life's activities. As William James once said, simply to live, breathe and move should be a delight. The thoroughly healthy person is full of optimism; "he rejoiceth like a strong man to run a race." We seldom see such overflowing vitality except among children. When middle life is reached, or before, our vital surplus has usually been squandered. Yet it is in this vital surplus that the secret of personal magnetism lies. The vital surplus should not only be safeguarded, but accumulated. It is the balance in the savings bank of life. Our health ideals must not stop at the avoidance of invalidism, but should aim at exuberant and exultant health. They should savor not of valetudinarianism, but of athletic development. Our aim should be not to see how much strain our strength can stand, but how great we can make that strength. With such an aim we shall, incidentally and naturally, find ourselves accomplishing more work than if we aimed directly at the work itself. Moreover, when such ideals are at-

tained, work instead of turning into drudgery tends to turn into play, and the hue of life seems to turn from dull gray to the bright tints of well-remembered childhood. In short, our health ideals should rise from the mere wish to keep out of a sick-bed to an eagerness to become a well-spring of energy. Only then can we realize the intrinsic wholesomeness and beauty of human life.

CHAPTER I

HEALTH HINTS FOR THE SOLDIER AND SAILOR

Section I—Camp Life

THE life of the modern soldier in camp and of the sailor on shipboard is far healthier than the life of the average civilian. In camp the soldier is protected from communicable disease by typhoid inoculation and by careful camp regulations, and on shipboard there is even closer supervision of the sailor. Many of the things which the civilian is too lazy or too indifferent to do the soldier does as a matter of custom or habit, or else they are done for him by the camp government.

Fresh air, physical training, simple diet, temperance—all of these are features of the modern camp. If a man is organically sound, able to measure up to the physical work, he will be physically transformed by the army life and brought up to a standard of robust health. Many are now writing from the camps telling of the benefits they have experienced, and saying that

they have never before in their lives felt so well and fit.

In the war zone, however, conditions will not be so favorable. While the army regulations and the watchfulness of sanitary officers will throw a large measure of protection around the soldier, the fatigue and strain of war and the conditions under which it is carried on, will require constant watchfulness on the part of the fighter.

This is especially true where soldiers are billeted on a foreign population whose methods of living differ from theirs and who have, by the strain and privations of war, been grievously handicapped in maintaining satisfactory community hygiene.

Cleanliness in the billet, in the camp, and in the trenches, so far as is attainable, is the first law of safety for the soldier. Never before have such enormous bodies of men assembled under similar conditions. While typhoid inoculation, compulsory in the army of the United States, has practically excluded typhoid from our army, no chances should be taken by the soldier and he should carefully shun doubtful water.

Many of the country wells and springs are infected. If possible, only water provided by the military authorities should be drunk. In billets the water should be boiled or purified with bleaching powder. Every such facility provided by the regimental surgeon or company commander and all his admonitions and instructions should be faithfully followed. As much harm to the army may result from failure to guard the sanitary line as from failure to hold the military line.

Section II—The Venereal Peril

It would be difficult to exaggerate the terrible menace to our army, and through it to our country, from syphilis and gonorrhea. With several million men gathered together under conditions that arouse the primitive as well as the higher passions of the race, and released from the restraint of normal social conditions, the soldier will be assailed by temptations more dangerous than the enemy's fire.

There is a strange paradox in men cheerfully and bravely facing mutilation and death for their country, while

at the same time wilfully exposing her to the peril of the most loathsome and terrible diseases known to humanity. This is no overstatement of the case. A syphilitic aftermath to the war would leave its mark upon the nation. It is not a happy thought upon which to dwell—the prospect of men returning from a heroic fight unfit to mate with the women of their country. It is probable that the military authorities will keep infected men under surveillance until apparently cured, but this does not relieve the soldier of his responsibility to his family and to his country.

The following is an extract from a leaflet issued by the War Department which plainly states the perils of these venereal diseases and counsels the soldier for his own protection. The truly brave man will avoid disease not solely for his own sake, but for that of his home and country:

"Every soldier should have in mind that he is decreasing the efficiency of his organization when he is on the sick report. In the past venereal disease has caused more sickness and a greater percentage of military inefficiency than any other disease."

In recent years it has caused about one-fourth of the total sickness of the army.

The venereal peril became so great in the United States Army that Congress in 1912 passed a law to the effect that any soldier who becomes unable to perform his duty on account of venereal disease shall lose his pay during the period he is absent in hospital from his organization.

How to Avoid Venereal Disease

The way to avoid venereal disease is to avoid prostitutes. Every prostitute, public or private, acquires a venereal disease sooner or later. It is a rarity for any of them to escape disease for any length of time; hence, a man is always in danger of contracting venereal disease when he has intercourse with a prostitute. A man is better off physically, is happier, and more content in every way if he will avoid prostitutes and lead a life which he can look back upon with satisfaction, and in which there is nothing that he would be ashamed for his people at home to know.

This war itself is being waged in defense of democratic and American ideals of womanhood and manhood against a nation which has trampled these ideals under foot—a nation which has raped Belgium and destroyed the lives of innocent women and children on land and sea.

On the other hand, there should not be an unreasoning or exaggerated apprehension with regard to the conditions that will prevail in our army in the field. In the first place, the spirit that animates our men is remarkable. They are entering this war, not as a reckless adventure, but with a high purpose and a devotion, not only to their country, but to the best ideals of the race and in defense of the liberties of mankind. Many of these men, whose conduct in civil life would be careless and without strong moral government, have been stirred to the better depths of their natures, and will not forfeit this gain in character for stupid and trivial debauchery. Furthermore under strong army discipline there will be a limitation of opportunities for vicious indulgence, and a government of men's actions which does not exist in civil life.

The admission rate for venereal diseases in the National army was for a time far in excess of that in the regular army, which is significant in this regard: at the present time the rate is about equal in all branches of the service and about the same as the regular army rate for 1916. Nevertheless, the admission rate for these diseases in the regular army shows that vice does exist, and so long as it prevails to any degree, it must be vigorously combated. The nonsensical talk that if the soldier is strong enough to fight he is strong enough to be trusted, and needs no government or protection against himself, is not in the true interest of the soldier. No man is so great or so strong as not to be menaced by vicious surroundings. The soldier has enough burdens to bear without the temptation to disease and moral injury. It is just as much the duty of our country to protect him from vice as to protect him from typhoid fever, and all loyal citizens will uphold the Government in its regulations to that end.

In this as in other conditions that menace the health of the soldier, and therefore the efficiency of the army,

the advice of the medical staff as to the prevention or thorough treatment of infection should be carefully followed.

Section III—Alcohol

Some have compared a soldier in the trenches to a man about to undergo a painful operation. Such a man is, of course, given an anesthetic to allay his pain, and the use of alcohol and tobacco by the soldier has been urged on such grounds. If the soldier were to be merely exposed for a day or an hour there might be some weight in such argument. But the war will not be over in a day, and the soldier is entitled to know the price that he must pay for narcotic indulgence when the opportunity is offered for it.

In the first place, alcohol has a depressing tendency. It does not increase a man's strength or endurance; quite the contrary. Just when a man needs his "punch" and his grit and the will to survive shock and wounds he finds his reserve gone.

Alcohol lowers blood pressure; hence it contributes to shock.

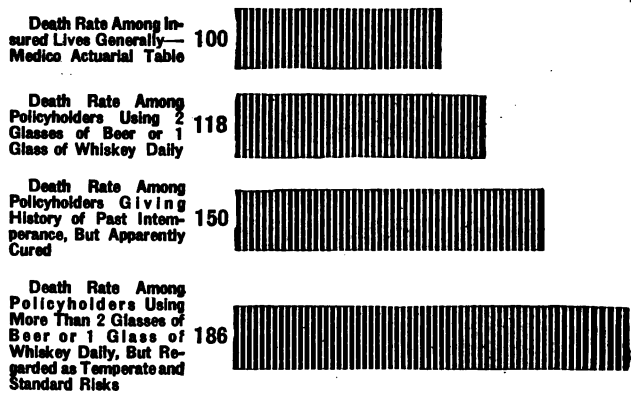
Alcohol lessens the resistance to infection.

Thus the two great perils to the wounded soldier—shock and infection—are increased by alcohol.

Alcohol is not a stimulant but a drug, a narcotic drug that depresses the nervous system and dulls its sensitivity. That is primarily why people drink it, for this dulling of the higher faculties of judgment and discrimination, so that the truth shall not disturb them. Now in this modern war above all the soldier needs his wits about him and needs to conserve all his energies and resources.

That alcohol is a handicap in the struggle for existence even in peace, and hence a handicap even more to be shunned in war, is shown by life-insurance experience.

The following chart shows how much greater the death rate is among those insurance policyholders who use alcohol than among average insured lives. Note that indulgence equivalent to that of the average steady daily drinker, but not intoxication, causes a death rate of 86 per cent. above the average. The investigation covered 2,000,000 lives.



We might fairly compare the moderate drinking class to a body of soldiers exposed to a distant artillery fire; some are hit and the loss is quite definite, but less, of course, than among another body of men at closer range; while those out of range wholly escape casualties from gun-fire. Keep out of the range of alcohol.

Major Lelean, quoted below, says: "Alcohol should be forbidden on the march: it lowers blood-pressure and causes rapid heat production without corresponding tissue repair."

Wherever we analyze the death rate among drinkers we find the same story

—more alcohol always spells higher death rate.

Section IV—Tobacco

One hesitates to say anything against tobacco as an indulgence for the soldier because of its popularity with soldiers and the widespread campaigning for the tobacco fund. No one would wish to deprive the soldier of a comfort or solace that will help him to keep his poise or to stand the long, hard strain of war. But we believe that the soldier is entitled to know the danger of tobacco and that he should be warned of the price he may have to pay for his indulgence.

Also there is a heavy responsibility involved in urging this habit upon men who are now free from it, and adding another unfortunate aftermath to the war. Those who are not already smokers have no need of contracting the habit now.

Let us see what hard-headed veterans of the present war—active army surgeons who have handled men at the front—have to say. Major Lelean of the Royal Army Medical Corps, who has published the lectures delivered

by him at the Royal Army Medical College recently, has this to say:

"To take now the next item that comes in the ration list—*tobacco*. The effects of smoking on the heart and on the quality of the pulse are well shown by pulse-tracings. Without going into the question of such various objectionable ingredients in tobacco as nicotine and the more harmful furfural, one may say that excess of smoking, particularly of cheap cigarets, produces rapid heart (tachycardia), muscular relaxation, and diminution of visual acuity. These conditions result in "shortness of wind," which is bad for marching, and produce muscular tremor and loss of effective sight, which it need scarcely be said are worse for shooting. Tobacco, like alcohol, has certain compensating advantages. The mild narcotic effect of tobacco in moderation is not apparently attended by deleterious action on habitual smokers. Seeing that the allowance provides only two pipefuls a day, it can do a man no harm to smoke one pipeful when he reaches camp and the other just before he turns in at night: the soothing effect is then most beneficial."

But again he says regarding soldiers on the march: "Smoking should be forbidden; it causes thirst, tremor, and rapid heart."

In the London *Lancet* for August 18, 1917, are presented the results of experiments (by Capt. John Parkinson, of the Royal Army Medical Corps, and Dr. Hilmar Koefod, of Harvard, U. S. A.) on The Immediate Effect of Cigaret Smoking on Healthy Men and on Cases of "Soldier's Heart."

They say that in the present war heart disturbances characterized by breathlessness after exertion, pain in the chest, rapid, irregular heart action, giddiness and exhaustion are quite common.

In some cases valvular disease of the heart (V. D. H.) is found and the soldier is discharged, but in others no organic defect can be discovered, and these are classified in the Army Medical Service as D. A. H. (disordered action of the heart) and are termed "soldier's heart." The experimenters summarize their findings as follows:

"These observations show that, in health, the smoking of a single cigaret by an habitual smoker usually raises the pulse-rate and blood pres-

sure perceptibly; and these effects are a little more pronounced in cases of 'soldier's heart.' Moreover, the smoking of a few cigarets can render healthy men more breathless on exertion, and manifestly does so in a large proportion of these patients.

"Excessive cigaret smoking is not the essential cause in most cases of 'soldier's heart'; but, in our opinion, it is, in many cases, an important contributory factor in breathlessness and pain in the region of the heart."

The results of these experiments are in line with those reported by Dr. George J. Fisher (Physical Director, International Committee, Young Men's Christian Association) in his interesting book, "The Physical Effects of Smoking."

The experiments were made on fifteen young subjects, physical directors, in normal condition of health and engaged in vigorous exercise daily. Seven were non-smokers and eight were classed as "moderate smokers." The experiments covered investigation of the heart rate after exercise, and physical precision and accuracy in baseball pitching.

The various phases of the experiments established the following conclusions:

I. Smoking affects the heart rate.

(a) The normal heart rate of smokers is higher than that of non-smokers.

(b) Smoking causes a delay in the return of heart rate to normal after exercise.

(c) The heart rate was increased in 63 per cent. of the smoking tests. The average heart rate at the end of fifteen minutes after smoking was 11.2 beats greater than the average normal heart rate. In 97 per cent. of all the tests taken without smoking, the normal heart rate returned, on an average, within five minutes.

II. Smoking causes loss in physical precision, and loss in accuracy of pitching a baseball.

(a) All smokers and non-smokers showed a loss in physical precision immediately after smoking.

(b) Smoking reduces accuracy in pitching a baseball—and it would, of course, have the same effect in pitching a bomb.

(c) In test where there was no smoking, all the men improved in accuracy of pitching.

In the accuracy tests of pitching, official league baseballs were used; the target was a block five feet square, with a bull's-eye one foot in diameter, surrounded by concentric circles six inches apart.

After each man had smoked one cigar, the smokers lost 11 per cent. in accuracy when pitching, and the non-smokers lost 13 per cent.—the average loss for the two groups being 12 per cent.

After each man had smoked two cigars, the smokers lost 11 per cent. in accuracy and the non-smokers 18 per cent.—the average loss for the two groups being 14½ per cent.

When no cigar was smoked during tests, the smokers gained 9 per cent. in accuracy in pitching and the non-smokers gained 10 per cent.—the average gain for the two groups being 9½ per cent.

The average difference in score made by smoking one cigar was 21½ per cent., and by smoking two cigars the average difference was 24 per cent.

Recent experiments likewise have shown that the same harmful effects of smoking on accuracy of aim applies to rifle shooting.

These findings should be of especial interest to those in the armed service of the country, upon whose accuracy of throwing and shooting, and upon whose steadiness, their effectiveness as fighters so largely depends.

Naturally if the solace of tobacco will keep a soldier from going insane or losing his control in short periods of strain, it might, in instances, prove a veritable medicine for some, but the average soldier should not have tobacco showered upon him without a word of warning as to its possible harmful effects on his heart and nerves. When tobacco is used at all, it should be with extreme caution and moderation.

Section V—Care of the Feet

So important for the soldier are sound and efficient feet that men otherwise healthy are rejected by the army for foot deformities or weaknesses that are likely to prove crippling under the strain of marching

and the added weight of equipment (often amounting to 50 pounds), or under the strain of trench warfare with its exposure to dampness and cold.

Most foot troubles are due to improper footgear. The average shoe turns the great or big toe outward from the middle line of the body and this often results in bunion, overlapping toes, or at least callosities and painful joints. Lack of a proper curve to the back of the heel permits undue friction and blistering.

The Munson last of the regular army shoe will prove a blessing to many soldiers who have been accustomed to improper shoes and who are consequently afflicted with serious foot ailments. The wearing of this shoe will correct many of these troubles. While shoes may be of the correct general form, it is well to have them molded to the foot, and this can be accomplished by standing with the new shoes on in about 2½ inches of water for 5 minutes, and then wearing them for an hour or so until they become molded to the foot. After drying they should be waterproofed by filling with castor- or cod-liver oil and

left to stand for twenty-four hours. The excess of oil can be removed by filling with dry bran, which absorbs the oil. Neats foot oil may be thoroughly rubbed in to keep the leather soft, if the above measure can not conveniently be carried out.

The foot exercises will strengthen the muscles that support the arch of the foot. Useful exercises are as follows:

Stand with the ball of the foot on the edge of a board or table, or a similar structure, so that the toes may be bent freely downward. Bend the toes up and down over this edge, 30 times, twice daily.

While standing on a flat surface lift the toes 30 times.

Separate the toes 30 times by use of the foot and toe muscles. This may require some assistance with the hands until practised a while.

Stand with the back to the wall, heels on the ground and against the wall. Raise the front of the foot, as far as possible, 30 times.

Rest on the inner margins of the feet. Curl the toes inward and backward under the feet as far as possible, 30 times.

Stand erect and extend one leg 30 degrees forward and describe a circle in the air with the toes, working them from without inward.

Sit in a chair, and with the feet free from the floor, describe circles with the toes, working from without inward, carefully toeing in.

It is not enough to wear proper shoes and perform these strengthening exercises. The feet must be cared for, and the wise soldier will not neglect certain precautions, however hard it may be to observe them during the stress of war.

Major Lelean, of the Royal Army Medical Corps, in his valuable little manual gives the following hints for daily care of feet: "On arrival in camp the men should remove their boots; clean, dry and dubbin them so that they keep waterproof and pliable. They should wash their feet in cold water, rubbing them with alum or spirit lotion to harden the skin if there be any tenderness. Clean socks and camp shoes should be put on, and the consequent sense of comfort is alone well worth the trouble.

"Finally, the socks worn on the march should be washed and kneaded

until perfectly soft and then dried, ready for morning, when socks and boots will be clean, soft and comfortable. When socks can not be washed they should be thoroughly dried and beaten soft."

Regulations governing these matters of foot care will undoubtedly be established in our service and should be thoroughly carried out by our soldiers.

The comfort derived from the toilette of the feet is remarkable, and seems out of all proportion to the simplicity of the measures, all of which shows how these small local troubles and strains react upon the nervous system and contribute to fatigue. Foot-strain and distress will render a man nervous just as eye-strain often does. Among preventive measures may be mentioned the use of foot powders, soaping the inside of the sock to induce a soft lather when the foot perspires. Foot powder is more useful in cold weather.

It is important to have well-fitting socks, sufficiently large, but not large enough to wrinkle and form ridges, which are often responsible for blistering. Holes likewise cause troubles.

Dilapidated socks may be replaced by a triangular piece of linen or greased paper. Place the foot on the triangle with toe toward the point or apex and then wrap the linen around the foot. With this soft material, there is no danger from wrinkling and ridges.

When there is trouble from blistering and friction, a strap wound in figure of eight around the instep and ankle will give much relief. Blisters should be pricked and touched with iodine and a strip of zinc oxide adhesive plaster applied warm, with a small hole in the center for escape of any secretion.

For offensively sweaty feet a 2 per cent. formalin solution can be used every day or two, or a 2 per cent. formalin ointment. Foot powder of talcum, with 10 per cent. boric acid and 3 per cent. salicylic acid is also useful.

Corns and bunions will not arise if the feet are well cared for and proper shoes worn; such conditions should be treated by the surgeon or chiropodist.

Section VI—"Trench Foot"

Much suffering and crippling has been caused by so-called trench foot or

frost bite. It is pointed out by Major Lelean and others that the condition often arises when the temperature is above freezing, owing to the constriction of tight puttees and prolonged standing in cold water. This is a matter that will receive the attention of regimental officers, as special measures have been and are being considered to protect the soldier. It has been suggested by some that the cloth puttees, wrapped around the legs, are less likely to cause trouble than rigid leather or canvas. It is important to protect the feet and legs from water, and also to prevent interference with the circulation of the skin by tight and rigid foot and leg gear.

Recent investigations suggest that infection plays a large part in trench foot. That resistance to such infection is lowered by cold and interference with the circulation, however, seems inevitable.

Other Forms of Foot and Joint Pains

Painful joints may be due to some form of infection arising in some other part of the body, such as the tonsils or teeth. Redness and swelling or

pain in the joints of the feet or in other joints or even in the muscles, when not apparently due to some local cause, suggest careful examination of mouth, tonsils and nasal cavities, for some focus of infection. Many cases of flat foot have been mistaken for rheumatism; so have cases of chronic infection been mistaken for flat foot, and local treatment, arches or orthopedic treatment have been without avail.

Section VII—Flies, Vermin, Lice, Etc.

When millions of men are associated in armies or camps, certain pests and parasites, which under ordinary conditions of living are of infrequent and negligible occurrence, assume the proportion of a plague. The protection of soldiers from such menaces is a matter of camp government and sanitary organization, but always complete success must depend on a loyal cooperation on the part of the soldier. Soil must not be polluted by urination or defecation, and all rules and instructions in this regard should be rigidly followed as a matter not only of self-preservation, but loyalty to one's

comrades and the cause. The admission of infection may be quite as injurious as the giving up of a trench or fleeing before the enemy. Food remnants, refuse, food tins or receptacles, or any material that will serve as a breeding ground for flies and mosquitoes, should not be scattered around the camp or trenches. Personal cleanliness, so far as it can be attained, must be observed and no pains spared to prevent the body and clothes from becoming infected with lice. In Serbia, lice were carriers of typhus fever. They have proven a pest even on the western front, and only rigid personal care on the part of the soldier can overcome this distressing condition.

The "de-lousing" of a camp, as it is technically called, is a problem that gives serious concern to the Medical Officer. The elaborate measures used in camps for the wholesale "de-lousing" of the soldier need not be described here, but the principles on which they are based will enable the soldier to personally protect himself to a certain degree.

The eggs are laid under the seams of clothing, and it is in these places where preventive measures are most

effective, such as ironing and greasing. The louse takes sixteen days after hatching to lay its eggs. If the clothing be freed from eggs at intervals of a fortnight a second breeding will not take place. Lice find their habitat on clothing of men. They do not survive after the tenth day if removed from their post, and are not found in empty houses or dug-outs. One man, according to Peacock, has harbored as many as 10,000 lice. Heat and various antiseptics kill them and oil asphyxiates them. It is upon these principles that the soldiers' clothing is ironed, exposed to steam, boiled or baked.

For lice on the scalp, a mixture of olive oil and kerosene (equal parts) is used. It is rubbed on the head and washed off after 24 hours. Kerosene may be applied neat and the head wrapped in a towel. The head may be shaved—a very simple and effective measure adopted by the Germans.

To protect against the body louse, smear the seams of clothing with grease, hot iron the seams or use N. C. I. powder by dusting it freely on the clothing. The men roll themselves in their clothing and in blankets

and this powder usually effectively destroys the lice during the night. The N. C. I. powder is composed of 96 per cent. naphthaline and 2 per cent. each creosote and iodoform. According to Col. T. H. Goodwin of the Royal Army Medical Corps, an even more effective jelly is made by melting 2 pounds of soft paraffin and adding 4 ounces of crude tar oil. A useful form of grease is: Crude oil 9 parts, soft soap 5 parts, water 1 part: this is known as "vermijelli."

As a protection against fleas, oil of pennyroyal is useful; also iodoform; but its odor is objectionable. Sprinkling iodoform under the door mat is said to be quite effective in keeping fleas out of quarters.

Section VIII—Tuberculosis (Consumption)

Lately, Colonel Dercle of the Medical Corps of the French Army and Colonel Bushnell of the Medical Corps of the U. S. Army have called attention to the need for allaying any undue public alarm on the score of tuberculosis in France. They point out that a large proportion of those reported as tuberculous in the French Army,

and referred for special examination with a view to discharge, were found to be free from any active tuberculosis and were restored to the ranks.

While this disease must be combated vigorously, there should be no exaggeration of the perils that beset our soldiers through infection. No doubt many will be built up and strengthened and their resistance to tuberculosis improved by the out-door life and physical training. In fact, we must not misinterpret the proper zeal of the medical men to reduce to a minimum the sickness and disability in the army as a fear of excessive mortality or of widespread disease.

The American soldier is, however, exposed to some menace from this disease, and it is his duty to take every precaution to protect himself.

Captain S. A. Knopf, of the Medical Reserve Corps, U. S. Army, and a member of the Hygiene Reference Board of the Life Extension Institute, has prepared a pamphlet on this subject, from which we freely quote.

The early symptoms of tuberculosis are as follows:

"The important earlier symptoms of pulmonary tuberculosis are long

continued cough, with or without expectoration, or hoarseness, loss of flesh, flushes or pallor in the face, feverish sensation in the afternoon, occasional night sweats, chilly sensation in the morning, loss of appetite, sometimes a little streak of blood in the expectoration, loss of strength manifesting itself in easy tiring, frequent colds, a perceptible quickening of the heart beats after slight exertion, a little change in disposition such as an increased irritability, or a feeling of depression.

"What can the soldier in the field do to prevent becoming predisposed to tuberculosis?

"Since one of the greatest predisposing causes to tuberculosis is alcohol, it is, of course, best for the soldier to abstain entirely from the use of liquor and strong alcoholic drinks. As far as possible he should eat regularly, keep his body clean, and rest when he can so as to avoid over-fatigue. He should keep his bowels in good condition and drink plenty of good pure water. He should also try to clean his teeth after meals whenever this is feasible. When his garments have become wet from rain

or snow he should not lie down and sleep in them if this can possibly be avoided; and he should be equally careful not to lie down on the moist ground without sufficient protection. But, of course, on the firing line and in trenches and dugouts these precautions cannot often be carried out, and one must do the best he can.

"If the air in the dug-outs and trenches seems to be vitiated, that is to say, foul and lacking oxygen, whenever circumstances will permit it, the soldier should go where the air is pure and take some deep breathing exercises. The simplest one of all is to inhale deeply, raising the shoulders during the active inhalation, moving them backward and remaining in that position, retaining the air for about 5 or 6 seconds, then exhale a trifle more quickly by moving the shoulders forward and downward. Repeat this exercise 6 to 8 times, and if convenient, repeat it after half an hour or an hour.

"If the dug-outs and trenches can be ventilated to admit fresh air, this should by all means be done. In tents and barracks and all other sleeping quarters, the soldier should, of course,

make it his business to see that these habitations are always well ventilated. Fresh air by day and by night is the best preventive as well as curative agent against tuberculosis.

"What should the soldier do so as not to spread tuberculosis?

"A soldier suffering from any symptoms of tuberculosis, especially if he coughs and expectorates, should gather a specimen of his sputum and take it to the doctor for examination. Until he has seen the doctor, he should use all the precautions possible; that is to say, spit in a piece of cloth, or in a receptacle which he should empty into the trench latrine, water-closet, or drain. During the cough he should hold the hand before the mouth and should never swallow his expectoration.

"If the soldier perceives any of the symptoms described, he need not think at once that he has tuberculosis, but it is his duty as a soldier to report his condition immediately to the surgeon in charge of his company. He will then be carefully examined, and proper care taken of him. If the ailment is not tuberculosis, the examination will demonstrate it; if it is tuber-

culosis, the early diagnosis and timely treatment will save the individual's life; for let it be known right here that of all the chronic diseases the human flesh is heir to, none offers so favorable a chance for cure as does pulmonary tuberculosis if discovered early."

Section IX—Shell Shock

The soldier who exercises proper precaution against the dangers discussed above will avoid their threatened consequences and also be best prepared against the enervating, torturing shell shock on the firing line.

The term "shell shock," now widely and too loosely used, is popularly supposed to be due to the profound impression on the nervous system occasioned by high explosives—a combination of physical and mental shock best withstood by the physically strong and clean-minded soldier. As a matter of fact many of the nervous manifestations usually included in the term are simply accumulative effects of general war strain evidenced by some profound mental or nervous failure during exposure to shell fire.

Many nervous disorders develop more readily in those with poor nervous and mental endowment at birth. Yet many people with average family histories are more or less unstable in their nervous organization. If the strain is sufficient they lose their poise, and drift into pitiable conditions of chronic ill-health and life failure. They escape from that grip on life which every organism and every race must make if it is to survive.

Some authorities hold that nervous maladies of war, so-called "war neuroses," should be considered as a special group of diseases, occurring in the main among people who would on the average successfully withstand the strains of civil life.

Sufferers from "shell shock" are not necessarily those who show hereditary or personal history of nervous insufficiency. They are merely individuals of sensitive types, whose normal resistance has been overcome by the extraordinary and unremitting impact of the peculiar shocks, strains, and stresses of modern war, unprecedented for its devilish ingenuity and torture.

War neuroses are rare among the wounded. The wounded state displaces shell shock and excludes the accumulated mental strains and stresses that have gone before. Another interesting fact is the frequency of war neuroses of the lesser magnitude among officers and the rarity among them of the more serious nervous manifestations of the hysterical type. The ratio of officers to men at the front is 1 to 30, among the wounded 1 to 24, but among those admitted to hospitals for war neuroses the ratio is 1 to 6.

No doubt there are cases of actual brain or nerve injury due to concussion of air accompanying shell explosions, but these mechanical causes are regarded as less frequently responsible for war neuroses than the mental effects of general war strain. Such cases need most delicate handling. Neither harshness nor unjust suspicion of malignering should be permitted by the medical officer; on the other hand the patient should not be looked upon as a hopeless nervous wreck incapable of responding to appeals to his latent manhood and control.

Some authorities have claimed that about 70 per cent. of the cases of "war nerves" are among average types. In handling such cases all agree that immediate treatment and a marked effort to restore the soldier's confidence and bring him to a firmer grip on the situation is the best remedy.

If it were more clearly understood that a bold front to any enemy will aid in his defeat there would be less nervous failure. Warning is given that sufferers from these nervous war maladies, who are too much coddled, who drift to their homes, and who become more or less fixed in their delusions, obsessions, fears, and other disabilities, offer the least hope of cure.

In the treatment of cases of so-called shell shock, stress is laid upon productive occupation. The men need to be distracted from themselves. When given something useful to do they adapt themselves to real work and regain their hold on life. Under proper treatment such men can be fully restored to normal poise and again made fit to meet with courage

and a smile the perils of civil or military life.

"Pack up your troubles in your old kit bag and smile, smile, smile." The sentiment of these words suggests the finest kind of resistance not only to many nervous maladies and mental ill-health but to the enemy on the battle line as well.

Of course, every important general measure possible will be adopted for safeguarding the soldier, yet it is hoped that these hints will be of help to the individual, who after all is personally responsible, to a large degree, for his own health and efficiency.

CHAPTER II

AIR

Section I—Housing

Air is the first necessity of life. We may live without food for days and without water for hours; but we cannot live without air more than a few minutes. Our air supply is therefore of more importance than our water or food supply, and good ventilation becomes the first rule of hygiene.

Living and working rooms should be ventilated both before occupancy and while occupied.

The most important features of ventilation are motion, coolness, and the proper degree of humidity and freshness.

There is an unreasonable prejudice against air in motion. A gentle draft is, as a matter of fact, one of the best friends which the seeker after health can have. Of course, a strong draft directed against some exposed part of the body, causing a local chill for a prolonged time, is not desirable; but a gentle draft, such as ordinarily oc-

curs in good ventilation, is extremely wholesome.

The popular idea that colds are derived from drafts is greatly exaggerated. A cold of any kind is usually a catarrhal disease of germ origin, to which a lowered vital resistance is a predisposing cause.

The germs are almost always present in the nose and throat. It is exposure to a draft plus the presence of germs and a lowered resistance of the body which produces the usual cold. Army men have often noted that as long as they are on the march and sleep outdoors, they seldom or never have colds, but they develop them as soon as they get indoors again.

Air should never be allowed to become stagnant. When there is no natural movement in the air, it should be put in motion by artificial means. This important method of practising air-hygiene is becoming quite generally available through the introduction of electric currents into dwellings and other buildings and the use of electric fans. Even a hand fan is of distinct hygienic value.

The importance of coolness is almost as little appreciated as the im-

portance of motion. Most people enervate themselves by heat, especially in winter. The temperature of living-rooms and work-rooms should not be above 70 degrees, and, for people who have not already lost largely in vigor, a temperature of 5 to 10 degrees lower is preferable. Heat is depressing. It lessens both mental and muscular efficiency.

It is obvious that fresh pure air is preferable to impure air. Air may be vitiated by poisonous gases, by dust and smoke, or by germs. Dust and smoke often go together.

A very common and at the same time injurious form of air-vitiation is that from tobacco smoke. Smoking, especially in a closed space such as a smoking-room or smoking-car, vitiates the air very seriously, for smoker and non-smoker alike.

As to dust, the sickness rate and death rate in certain occupations, particularly those known as the dusty trades, are appreciably and even materially greater than in dustless trades.

The bacteria in air ride on the dust-particles. In a clean hospital ward, when air was agitated by dry sweep-

ing, the number of colonies of bacteria collected on a given exposure rose twenty-fold, showing the effect of ordinary broom-sweeping.

The air we breathe should be sunlit when possible. Many of our germ enemies do not long survive in sunlight.

The healthy, hardened condition of the well-trained soldier is largely due to his exposure to fresh moving air.

Section II—Clothing

Air may be shut out not only by tight houses but also by tight clothes. It follows that the question of clothing is closely related to the question of ventilation. In fact, it is a reasonable inference from modern investigations that air-hygiene concerns the skin as well as the lungs. Therefore the hygiene of clothing assumes a new and hitherto unsuspected importance. A truly healthy skin is not the waxy white, dingy or sallow skin, but one which glows with color.

The hygiene of clothing includes ventilation and freedom from pressure, moderate warmth, and cleanliness. Loose, porous underclothes are

already coming into vogue. But effective ventilation, namely, such as will allow free access of air to the skin, requires that our outer clothes—including women's gowns and men's shirts, vest-linings, and coat-linings—should also be loose and porous. Here is one of the most important but almost wholly neglected clothing reforms. Most linings and many fabrics used in outer clothes are so tightly woven as to be impervious to air. Yet porous fabrics are always available, including porous alpacas for linings. To test a fabric it is only necessary to place it over the mouth and observe whether it is possible or easy to blow the breath through it. All bedding should be porous. Beds should be well aired after being used.

An air-bath promotes a healthy skin and aids it in the performance of its normal functions. Not every one can visit air-bath establishments or outdoor gymnasia or take the modern nude cure by which juvenile consumptives are sometimes treated (even in winter, after becoming gradually accustomed to the cold); but any one can spend at least a little time in a state of nature on rising in the morning and

upon retiring at night, when there are many things which are usually done while one's clothes are on which can be done just as well while they are off. Brushing the teeth, washing the hands, shaving, etc., necessarily consume some time during which the luxury of an air-bath can be enjoyed. Exercising in cold air, *if not too cold,* with clothing removed, is an excellent means of hardening the skin and promoting good digestion.

The constriction from rigid or tight corsets, belts (the latter in men as well as in women), tight neckwear, garters, etc., interferes with the normal function of the organs which they cover. All such constriction should be carefully avoided. The tight hats generally worn by men check the circulation in the scalp. Tight shoes with extremely high heels deform the feet and interfere with their health. The barefoot cure is not always practicable, but any one can wear broad-toed shoes with a straight inner edge, such as the army shoe (Munson last), and do his part to help drive pointed toes out of fashion. Such a reform should not be so difficult as to rid the women of China of their particular form of

foot-binding. Several types of shoes, made to fit the normal foot instead of to force the foot to fit them, are now available. In all except cold weather, low shoes are preferable to high shoes. When possible, sandals, now fortunately coming into fashion, are preferable to shoes, especially in early childhood (but the adult, whose calf-muscles and foot-structure are not always adapted to such foot-gear, must be cautious in their use lest flat foot result).

Only the minimum amount of clothing that will secure warmth should be worn. Woolens protect most, but for that very reason they require the least exercise of the temperature-regulating apparatus of the body. While wool is also highly absorbent of moisture, it does not give off that moisture quickly enough. Hence, if worn next to the skin, it becomes saturated with perspiration, which it long retains to the disadvantage of the skin. Consequently woolen clothing is best confined to outer garments, designed especially for cold weather. The underclothes should be made of some better conducting and more quickly drying material, such as cotton or

linen. In winter light linen-mesh, and medium wool over that, can be worn by those who object to either linen or wool alone.

As to color, the more nearly white the clothes the better. This is especially true in summer, but there is believed to be some advantage in white at all seasons.

Those who have learned to clothe themselves properly find that they have grown far more independent of changing weather conditions. They do not suffer greatly from extreme summer heat nor extreme winter cold. Especially do they note that "raw" or damp cold days no longer tax their strength.

Section III—Outdoor Living

But we must not depend altogether on ventilating our houses and our clothes. We must turn our thoughts toward an outdoor life. The air of the best ventilated house is not as good as outdoor air. Those who spend much of their lives in the open enjoy the best health and the greatest longevity. It is a great advantage to

go into camp in summer and to live in the country as much as possible.

Climate, of itself, is a secondary consideration. Not every one can choose the best climate, but, after all, the main advantages of fresh air can be enjoyed in almost any locality. Even in a city, outdoor air is, under ordinary circumstances, wonderfully invigorating.

The common prejudice against damp air greatly exaggerates its evils. While moderate dryness of air is advantageous, it seems nevertheless true that to live in damp, even foggy, air out-of-doors is, in general, more healthful than to live shut up indoors.

Above all, outdoor occupations should, when possible, be chosen in preference to indoor occupations, such as working on a farm rather than in a factory. It would help solve some of the greatest problems of civilization, if, in consequence of an increased liking for outdoor life, larger numbers of our population should join the "back-to-the-farm" movement. Leaving the country for the city is often disastrous even for the purpose in view, namely, to gain wealth. For wealth gained at the expense of health always proves

in the end a bitter joke. The victim proceeds through the rest of his life to spend wealth in pursuit of health.

Section IV—Outdoor Sleeping

Unfortunately most people cannot live out of doors all of the time, and many are so situated that they cannot even secure ventilation, granted that they want it. But there is one important part of the twenty-four hours when most people can completely control their own air supply. This is at night. We spend a third of our time in bed. Most of us live such confined lives during the day that we should all the more avail ourselves of our opportunities to practise air hygiene at night.

It is the universal testimony of those who have slept out-of-doors that the best ventilated sleeping-room is far inferior in healthfulness to an outdoor sleeping-porch, open tent, or window tent (large enough to include the whole bed). For generations, outdoor sleeping has occasionally been used as a health measure in certain favorable climates and seasons. But only in the last two decades has it

been used in ordinary climates and all the year round.

Outdoor sleeping increases the power to resist disease, and greatly promotes physical vigor, endurance, and working power.

Many people are still deterred from sleeping out by a mistaken fear of night air and of the malaria which they imagine this dreaded night air may bring. To-day we know that malaria is communicated by the bite of the anopheles mosquito and never by the air. The moral of this is not to shut out the night air, but, when necessary, to shut out the mosquito by screens. The experiment has been made of sleeping out-of-doors *in screened cages* in the most malarial of places and no malarial infection resulted, though those who were unprotected and were consequently bitten by mosquitoes contracted malaria as usual. The truth is that night air, especially in cities, is distinctly purer than day air, on account of the fact that there is much less traffic at night to stir up dust.

An outdoor tent must be kept well opened. Otherwise it fails of its purpose. The common opinion that a tent is ventilated through the "meshes" of

the canvas is erroneous. Canvas is a tightly woven fabric and little impervious to air. That is why it makes good sails. One of the most modern boys' camps has given up the use of tents altogether, employing instead open wooden "shacks," because of the difficulty of keeping the tents sufficiently open, especially in rainy weather.

Complete directions for convenient out-of-door sleeping will be furnished, upon application, by the Life Extension Institute.

Section V—Deep Breathing

Ordinarily breathing should be involuntary, but deep breathing exercises should be employed daily. "Ten deep breaths every hour" is one physician's recipe for avoiding tuberculosis. A Russian author, who suffered a nervous breakdown, found —after trying many other aids to health without success—that a retired life for several months in the mountains in which simple deep-breathing exercises practised systematically every day formed the central theme, effected a permanent cure. Deep

breathing is a great resource for people who are shut in most of the day. If they will seize the chance, whenever it offers, to step out-of-doors and take a dozen deep breaths, they can partly compensate for the evils of indoor living.

Breathing exercises should be deep, slow, rhythmic, and through the nose, not through the mouth. A certain Oriental deep-breathing exercise is particularly valuable to insure slowness and evenness of the breath. It consists of pressing a finger on the side of the nose, so as to close one nostril, breathing in through the other nostril, breathing out of the first nostril in the same manner and then reversing the process. Attention to the slight sound of the air, as it passes through the nose, enables one to know whether the breathing is regular or is slightly irregular.

Muscular exercises stimulate deep breathing, and, in general, the two should go together. But deep breathing by itself is also beneficial, if very slow. Forced *rapid* breathing is comparatively valueless, and indeed may be positively harmful. Oxygen is absorbed only according to the demand

for it in the body and not according to the supply.

Singing requires deep breathing, and is for that and other reasons an excellent hygienic practise.

The mode of our breathing is closely related to our mental condition; either influences the other. Agitation makes us catch our breath, and sadness makes us sigh. Conversely, slow, even breathing calms mental agitation. It is not without reason that, in the East, breathing exercises are used as a means of cultivating mental poise and as an aid to religious life.

CHAPTER III

FOOD

Section I—Quantity of Food

THE body has often been compared to a blacksmith's forge, the lungs being the bellows and food the coal. The comparison is a good one, for food is actually burned in the body by the aid of the air we breathe.

All food is capable of being used as body-fuel and by far the greater part of it is so used. Consequently, food is measured in fuel-units, called calories.* Many people eat too much, that is, too many calories; some eat too little, that is, too few calories. In both cases the person is usually unaware of the fact, because he makes the mistake of measuring his food by its weight or bulk. Some foods are concentrated, that is, contain many calories of food value in a given bulk; others are bulky, that is, contain few calories in a given bulk. For instance, olive oil is concentrated, and most vegetables are bulky. A third of an ounce of olive oil contains 100 calories, which is as much

*A calory is the amount of heat required to raise one pound of water 4 degrees Fahrenheit.

as is contained in a pound or more of tomatoes, lettuce, celery, cucumbers, string beans, asparagus, or watermelon.

It will help to give a picture of food values if, before going further, we note how much it takes of some of the common foods to make a given amount of food value, say 100 calories. It is surprising in how many cases the ordinary amount of food served at table happens to contain about 100 calories. We find 100 calories in a small lamb chop (weighing about an ounce); in a large egg (about 2 ounces); in a small side-dish of baked beans (about 3 ounces); in 1½ cubic inches of cheese (about an ounce); in an ordinary side-dish of sweet corn (about 3½ ounces); in one large-sized potato (if baked, about 3 ounces; if boiled, about 4 ounces); in an ordinary thick slice of bread (about 1½ ounces); in one shredded wheat biscuit (about an ounce); in a very large dish of oatmeal (about 6 ounces); in a small piece of sponge-cake (about an ounce); in a third of an ordinary piece of pie (about 1½ ounces); in three teaspoonfuls or 1½ lumps of sugar (about 1 ounce); in a dozen peanuts

(about 2/3 of an ounce); in eight pecans (about ½ an ounce); in four prunes (about 1 ounce); in two apples (about 7 ounces); in a large banana (about 4 ounces); in half a cantaloupe (about 9 ounces); in seven olives (about 1½ ounces); in a very large orange (about 10 ounces); in an ordinary pat of butter (about ½ an ounce); in a quarter of a glass of cream (about 2 ounces); in a small glass of milk (about 5 ounces).

The ordinary sedentary man needs about 2,500 calories per day—a soldier may require 4,000 per day. But the larger the person (provided the bulk is due to muscle and active tissue and not to fat) or the more muscular the work he does, the more food he needs. It has been found that the number and activity of cells forming the organs and muscles and blood affect the food requirement.

Life insurance experience has clearly shown that weight, especially in relation to age, is an important factor in influencing longevity.

Except in the earlier ages of life, overweight (reckoned relatively to the average for that age) is a more un-

favorable condition, in its influence on longevity, than underweight.

The question of whether an individual is really underweight or overweight cannot be determined solely by the life insurance tables. Some types who are of average weight, according to the tables, may be either underweight or overweight when considered with regard to their framework and general physical structure. Nevertheless, it should be remembered that notwithstanding the effort of life insurance companies to carefully select the favorable types of overweight and underweight, the mortality experience on youthful underweights has been unfavorable, and the mortality experience on middle aged and elderly overweights has been decidedly unfavorable. The lowest mortality is found among those who average, as a group, a few pounds over the average weight before age 35, and a few pounds under the average weight after age 35. That is, after the age of 35, overweight is associated with an increasingly high death rate, and at middle life it becomes a real menace to health, either by reason of its mere presence as a physical handicap or because of the

faulty living habits that are often responsible for its development.

One reason why many people eat great quantities of food without realizing it, is the common delusion that many articles such as candy, fruits, nuts, peanuts, popcorn, often eaten between meals, "do not count." Another common oversight is to overlook accessories, such as butter and cream, which may contain more actual food value than all the rest of a meal put together. Ice-cream and other desserts also have more food value than is usually realized. Nature counts every calory very carefully. If the number of calories taken in exceeds the number used by the body (or excreted unused), the excess accumulates in fat or tissue. Thus, if some 3,000 calories are taken in each day and the calories used up or excreted are only 2,800, then 200 must be retained and accumulated in the body.

A person who is not heavy enough can usually gain weight by following the general rules of hygiene, especially in the matter of increasing the fuel or energy foods. But he should not force himself to eat beyond his natural capacity to digest and assimi-

late the food, while overfatigue and exhausting physical exertion should be carefully avoided.

As age advances, the consumption of meat and all flesh foods should be decreased and that of fruit and vegetables, especially those of bulky character and low food value, such as lettuce, tomatoes, carrots, turnips, salsify, oyster-plant, watercress, celery, parsnips, should be increased.

Generally the quantity of food should be slightly decreased in hot weather, when fewer calories are needed to sustain the heat of the body. In particular, less meat should be eaten in the summer, because of the special tendency of meats and like foods to produce immediate heat.

It is muscular, not mental work, which uses up the greater part of our food. The common impression that brain-work or expenditure of mental energy creates a special need for food is erroneous. The sedentary brain-worker often gains weight without eating very much. He needs to take more exercise, to use up the food, but if he will not take exercise, then he should reduce his food even below the

small amount on which he gains weight.

Which meal in the day should be heavy and which light depends largely on one's daily program of work, the aim being to avoid heavy meals just before heavy work. When very tired it is advisable to eat only lightly, as of fruits and salads. A man who eats heartily when he is very tired is likely to be troubled afterward with indigestion.

Section II—Repair Foods

In the last section it was stated that food is fuel. But there is one constituent of food which, while it *can* be used as fuel, is especially fitted for an entirely different purpose, namely, to build tissue, that is, to serve for the growth and repair of the body. This tissue-building constituent in food is called protein. The two other chief constituents in food are fat and carbohydrate, the last term embracing what are familiarly known as starch and sugar. Fats and carbohydrates are only for fuel and contain carbon as the essential element. Protein contains nitrogen as the essential ele-

ment in tissue-building. The white of egg and the lean of meat afford the most familiar examples of protein. They consist chiefly of protein and water. But meat and eggs are not the only foods high in protein. In fact, most ordinary foods contain more or less protein. The chief exceptions are butter, oleomargarine, oil, lard, and cream — which consist of fat (and water)—and sugar, sirups, and starch, which consist of carbohydrate (and water).

Foods should be so selected as to give to the ration the right amount of protein, or repair-foods, on the one hand, and of fats and carbohydrates, or fuel-foods, on the other. A certain amount of protein is absolutely essential. While, for a few days, protein may be reduced to little or nothing without harm, if the body be long deprived of the needed protein it will waste away and ultimately death will result. Therefore, too little protein would be a worse mistake than too much.

The right proportion of protein has been the subject of much controversy, but has lately been practically settled by an immense laboratory experiment;

no less than the feeding of the German nation. About half the amount of protein formerly thought to be necessary has been found sufficient, according to the best authorities. What are now regarded as the best investigations, give the proper proportion as about 10 per cent. of the total number of heat-units consumed.

If all protein were as thoroughly utilized as is the protein of meat, milk, eggs and nuts, 7 calories out of 100 would be ample, but all vegetable proteins are not so completely available. Making proper allowance for this fact, we reach the conclusion that 10 calories out of every 100 are sufficient.

A chief and common error of diet consists, then, in using too much protein. Instead of 10 calories of every 100, many people in America use something like 20 to 30. That is, they use more than double what is known to be ample. This excessive proportion of protein is usually due to the extensive use of meat and eggs, although precisely the same dietetic error is sometimes committed by the excessive use of other high-protein foods, such as fish, shell-fish, fowl, cheese, peas and beans, or even, in exceptional cases, by

the use of foods less high in protein when combined with the absence of any foods very low in protein. The idea of reducing the protein in the diet is still new to most people.

Flesh food — fish, shell-fish, meat, fowl—when used in great abundance, are subject to additional objections. They are the most expensive sources of protein and they tend to produce an excess of acids, are very prone to putrefaction, and contain "purins" which lead to the production of uric acid. This is especially true of sweetbreads, liver and kidney. The well-known deficiency in lime of flesh foods often needs to be taken into consideration in the dietary.

If one chooses he may safely exclude meat from his dietary provided he takes care that his daily bill of fare shall include a liberal supply of milk, eggs or nuts. It is also important to eat a variety of foodstuffs, including a liberal proportion of fresh vegetables, such as lettuce, cabbage and celery, as well as potatoes and other root vegetables. All parts of the plant, roots and leaves as well as seeds, are needed for perfect nutrition.

The amount of protein contained in juicy fruits, and vegetables, with the exception of the potato, is so small as to be negligible. Nuts and legumes (peas and beans) are very rich in protein. The percentage of protein found in most nuts and in peas and beans is even greater than in ordinary meats. The soy bean is particularly rich in protein. The protein of nuts and of the soy bean may replace that of meat when this is considered necessary or desirable.

Greens and wheat bran, rich in lime, are useful supplements to the ordinary diet, especially when sugar, fine flour bread and other foods likewise deficient in lime constitute the chief constituent of the bill of fare. Pepper and other hot condiments are not foods. It is far better to discard them from the dietary. Salt should be used sparingly. Ordinary foods contain naturally sufficient salt to satisfy the real needs of the body. Only the demands of the palate make necessary the addition of salt to the foods.

A few persons are " sensitized " and unfavorably affected by certain foods, especially certain kinds of pro-

teins, and most frequently animal proteins, such as those of eggs, milk, or fish; not infrequently, however, the difficulty is wholly mental. When one is very tired the stomach shares in the general exhaustion. Its glands do not secrete and its muscles do not contract with normal activity and vigor.

Section III—Hard, Bulky, and Uncooked Foods

The wise choice of foods does not consist entirely in balancing the ration as to protein, fat, and carbohydrate.

Hard foods, that is, foods that resist the pressure of the teeth, like crusts, toast, hard biscuits or crackers, hard fruits, fibrous vegetables and nuts, are an extremely important feature of a hygienic diet. Hard foods require chewing. This exercises the jaws and improves the condition of tooth sockets and teeth, and insures the flow of saliva and gastric juice. If the food is not only hard, but also dry, it still further invites the flow of saliva. Stale and crusty bread is preferable to soft fresh bread and rolls on which so many people insist. The Igorots of the Philippines have perfect teeth

so long as they live on hard, coarse foods. But civilization ruins their teeth when they change to our soft foods.

Most of the ordinary foods lack bulk; they are too concentrated. For this purpose it is found that we need daily, at the very least, an ounce of cellulose, or "woody fiber." This is contained in largest measure in fibrous fruits and vegetables—lettuce, celery, spinach, asparagus, cabbage, cauliflower, corn, beets, onions, parsnips, squash, pumpkins, tomatoes, cucumbers, berries, etc.

Until recently would-be food reformers have made the mistake of seeking to secure concentrated dietaries, especially for army rations. It was this tendency that caused Kipling to say, "compressed vegetables and meat biscuits may be nourishing, but what Tommy Atkins needs is bulk in his inside."

Cooking is an important art; but some foods when cooked lose certain small components called vitamins, which are also found in the skin or coating of grains, especially rice, also in yolk of egg, raw milk, fresh fruit, and fresh vegetables, especially peas

and beans. These vitamins are very important to the well-being of the body. Their absence is probably responsible for certain diseases, such as beriberi, scurvy, and possibly pellagra, as well as much ill health of a less definite sort.

This subject still requires much investigation, but we know that very limited or narrow diets and food, altered in some way by cooking, can apparently cause ill health and a condition of poisoning quite different from simple starvation. Some raw or uncooked foods, therefore, such as lettuce or tomatoes, celery, fruits, nuts, and milk, should be used in order to supply these minute and as yet not well-understood substances which are destroyed by the prolonged cooking at the temperature which is employed in order to sterilize canned foods. They are also diminished and often destroyed by ordinary cooking, except in acid fruits and acid vegetables.

It is true that only very clean milk is entirely safe in an absolutely raw state, and that heat is usually needed to kill the germs. But this heat, even at the comparatively low temperature of pasteurization, has been thought to

destroy the vitamins that prevent scurvy. Orange juice should always be given to infants over one month old who are fed pasteurized milk.

Not all foods can be taken raw with advantage. Most starchy foods, such as cereals and potatoes and unripe fruit, must, of course, be cooked in order to be made fit to eat.

Raw foods have dangers of their own in carrying germs and parasites, and it is extremely advisable that all raw foods should be very thoroughly washed before eating.

In addition to protein, fat, carbohydrate, and vitamins, there are other elements which the body requires to maintain chemical equilibrium, and for the proper maintenance of organic functions. These are the fruit and vegetable acids and inorganic salts, especially lime, phosphorus, and iron. These substances are usually supplied, in ample amounts, in a mixed diet, containing a variety of fruits and vegetables and an adequate amount of milk and cream. Potatoes, feared by some in acid condition (such as gout), are actually valuable because of their alkalinity. Most acid fruits are convertible into alkaline salts in the body

and help to maintain the alkalinity of the blood. They do not cause gout or rheumatism.

Section IV—Thorough Mastication

Whether it be from lack of hard foods, requiring prolonged chewing, or from the nervous hurry of modern life, or from other causes, it is undoubtedly a fact that most people in America eat too rapidly. The correction of this habit will go far toward reforming an individual's diet in every way.

Thorough mastication means masticating up to the point of involuntary swallowing. It does not mean forcibly holding the food in the mouth, counting the chews, or otherwise making a bore of eating. It merely means giving up the habit of forcing food down, and applies to all foods, even to liquid foods, which should be sipped.

The consequences and evils of insufficient mastication are many, and may be enumerated as follows: Insufficient use of the teeth and jaws (and hence dental decay as well as other and worse dental evils); insufficient saliva mixed with the food (and hence imperfect digestion of the starchy sub-

stances); insufficient subdivision of food by mastication (and hence slow digestion); the failure of the taste nerves to telegraph ahead, as it were, to the stomach and other digestive organs an intimation of the kind and amount of digestive juices required (and hence indigestion); the overseasoning of food to make it relishable even when bolted (and hence overeating and irritation of the mucous lining); the excessive use of meat and eggs and like foods, which can be eaten rapidly with relative impunity, and the corresponding neglect of other foods which require more mastication, like bread, grains, vegetables, and salads (and hence intestinal poisoning).

A great cause of ill health is overuse of sugar in concentrated form, candy, etc., especially by the sedentary. Sugar has a high food value and is readily utilized for combustion. If taken between meals it is likely to greatly increase the calories and thus may lead to *overnourishment* and exclude more complete food from the dietary.

There is, for normal people, no objection to drinking a moderate amount of water at meals—say one or two

glassfuls — provided it is not taken when food is in the mouth and used for washing it down.

Not a few people believe that certain foods have ill effects for them, but the evils are often more apparent than real. For instance, many people think that nuts never agree with them, when the trouble really is that they do not masticate them properly. Many think peanuts indigestible, not realizing either the importance of mastication or the importance of avoiding over-roasting. The ordinary peanuts are over-roasted. Peanuts very slightly roasted and very thoroughly masticated seldom disagree with one. Others believe that bananas never agree with them, when the fact is they eat them too green. The banana vender usually finds that the ignorant public buys his fruit best when its color is an even yellow, and he puts aside for himself the only bananas ripe and fit to eat, namely, those which are mottled or nearly black.

As the subject of food value is a little difficult for the average reader, the Life Extension Institute has undertaken to present in the simplest

form the fundamentals of proper feeding as follows:

1—Fuel Foods

As in the case of an engine, the main requirement is for fuel. Unlike an engine, however, if the human body does not secure sufficient fuel it will literally burn to death, the tissues being drawn upon to supply the fuel. On the other hand, the human engine may easily become overstoked by an excess of fuel. The following list shows the main fuel foods, the great foundation foods of the diet, that supply energy for muscular work. Mental work requires so little extra fuel that it is not necessary to consider it specially. There are three groups of fuel foods. Here they are in the order of their cost per calory, those giving most energy for the money heading each list:

(a) Starchy Foods

Cornmeal	Cornstarch
Hominy	Dried lima beans
Broken rice	Split peas, yellow
Oatmeal	Dried navy beans
Flour	Bread
Rice	Potatoes
Macaroni	Bananas
Spaghetti	

(b) Sugars

Sugar	Candy
Corn syrup	Molasses
Dates	Most fruits

(c) Fats

Drippings	Peanut butter
Lard	Milk
Salt pork	Bacon
Oleomargarine	Butter
Nutmargarine	Cream

About 85 per cent. of the fuel for the body should come from these groups, using starchy foods in largest amount, fats next, and sugars least.

2—Building and Repair Foods

These are divided into proteins and mineral salts.

(a) Proteins, or "Body Bricks." These food elements are found in greatest abundance in lean meat of all sorts (including fish, shell food and fowl), milk, cheese, eggs, peas and beans, lentils, and nuts. There is also a fair amount of protein in cereals and bread (about 10 per cent.), which are

both building and fuel foods. Most foods contain some protein. Those above mentioned are richest in protein and hence are termed "Building" or "Repair Foods."

The following is a list of the building and repair foods in the order of their cost, those giving most building and repair material for the money heading the list:

Beans (dried white)	Peanuts
Dried peas	Macaroni
Oatmeal	Mutton, Leg
Cornmeal	Beef, Lean rump
Beans, dried lima	Milk (9c. a quart)
Bread	Beef, Lean round
Bread, whole wheat	Lamb, Leg
Bread, Graham	Eggs (24c. a dozen)
Salt cod	Halibut
Milk, skimmed (6c. a quart)	Porterhouse steak
Cheese (American)	Eggs (36c. a dozen
	Almonds, shelled

(b) Mineral Salts. These are found in milk, green vegetables, fruit, and cereals made from the whole grains, and egg yolks.

3—Regulating Foods

(a) Mineral Salts. These minerals, which have been mentioned as repair foods, are also regulating foods, and help to keep the body machinery running properly.

(b) Water. Water is an important regulating food. Many people drink too little. Six glasses of water a day is the average requirement—one between meals and one at meals.

(c) Ballast or Bulk. This is furnished by cereals and vegetable fiber, which is found in whole wheat or Graham flour, in bran, leaves and skins of plants, and skins and pulp of fruits. Examples are: *Vegetables* — Lettuce, parsnips, carrots, turnips, celery, oyster plant, cabbage, Brussels sprouts, tomatoes, salsify, Spanish onions, spinach. *Fruit* — Apples (baked or raw), pears, currants, raspberries, cranberries, prunes, dates, figs, oranges.

(d) Hard Foods. Vigorous use of teeth and jaws is insured by hard foods, such as crusts, hard crackers, toast, Zwieback, fibrous vegetables and fruits, celery and nuts, which are

necessary to keep the teeth and gums in a healthy condition.

(e) Accessories or Vitamins. These are minute substances (vitamins and lipoids) present in a very small quanity in a number of foods and apparently necessary to keep the body in health. That is, the absence of these elements seems to lead to poisoning of the body, which results in such disturbances as scurvy, beriberi, and other so-called "deficiency" diseases. Milk, eggs, whole wheat, corn, oatmeal, potatoes and oranges, skins or hulls of cereals, fresh meat, fresh peas and beans are thought to contain them. It seems necessary to include the leaves of plants (green vegetables) when the seeds (cereals, grain, flour, etc.) are used as food if the diet is to be complete and well balanced. Fruit and vegetable acids are regulating. They keep the blood alkaline and prevent constipation.

Food should be thoroughly chewed or insalivated in order to insure good digestion and prevent overeating, especially of protein food. This can easily be attained, not by directing attention to chewing, but by tasting the food thoroughly until it slides

naturally down the gullet into the stomach. If attention is given to tasting the food during the first few chews the habit will easily be formed.

CHAPTER IV

POISONS

Section I—Constipation

If the human body be likened to a steam-engine, its wastes correspond to the ashes.

The injury which comes from the retention of the body's waste products is of the greatest importance. The intestinal contents become dangerous by being too long retained, as putrefying fecal matter contains poisons which are harmful to the body. Abnormal conditions of the intestines are largely responsible for the common headache malady, and for a generally lowered resistance, resulting in colds and even more serious ailments. Constipation is extremely prevalent, partly because our diet usually lacks bulk or other needed constituents, but partly also because we fail to eliminate regularly, thoroughly, and often.

Free water-drinking when the stomach is empty, especially before breakfast and between meals, is beneficial in constipation. Free water-drinking at

meals may prove constipating. Some people find a remarkable improvement in health following the adoption of the habit of regular water-drinking. Not only does it promote bowel action and help the kidneys carry off waste products, but it probably tends to prevent the absorption of poisons from the bowels into the blood. The blood must always have its due amount of water. If this is not supplied regularly through the mouth it will be absorbed from the bowels, which will become drier than normal. In other words, if the thirsty blood is not supplied with pure water it will drink sewage.

On the other hand, water-drinking can be overdone. Excess of water should be avoided, especially by the very feeble or those suffering from heart trouble or dropsy. A urinary analysis will help determine whether one is drinking too little or too much water. But a normal thirst ought to be the chief regulator.

The best regulators of the bowels are foods. Foods should possess sufficient bulk to promote the action of the intestines and should contain a due amount of laxative elements. Foods which are especially laxative

are prunes, figs, most fruits except bananas, fruit juices, all fresh vegetables, especially greens of all sorts, wheat-bran, and the whole grain cereals. Oils and fats are also laxative but cannot be used in sufficiently large quantities to produce very laxative effects without producing loss of appetite. Foods with the opposite tendency are rice, boiled-milk, fine wheat-flour in bread, corn-starch, white of egg.

The use of prepared wheat-bran in cereals, in bread, and even in vegetables is a preventive of constipation, as is also the use of agar-agar, a Japanese seaweed product. This is not digested and absorbed, but acts as a water-carrier and a sweep to the intestinal tract. It should be taken without admixture with laxative drugs.

Paraffin oil is especially good as an intestinal lubricant to assist the food to slip through the intestinal tube at the proper rate of progress, provided the oil is first freed, by long-continued shaking with water, from certain dangerous impurities.

It is advisable, in general, to avoid cathartics except under medical supervision, since certain drugs are often

very harmful when their use is long continued, and the longer they are used the more dependent on them the user becomes. Laxative drugs, even mineral waters, should never be used habitually.

The occasional, but not habitual, use of an enema (with warm water followed always by a second enema of cool water, to prevent relaxation) is a temporary expedient.

Massage of the abdomen, deep and thorough, with a creeping movement of the ends of the fingers on the left side of the abdomen from above downward, also promotes the process of defecation.

The normal man should find no difficulty in having complete movements regularly two or three times a day by merely living a reasonable life, being careful especially to avoid overfatigue, to include sufficient bulk in the food, to take regular exercise, including, in particular, breathing exercises, and to maintain an erect carriage.

The natural instinct to empty the bowels, like many other natural instincts, is usually deadened by failure to exercise it. Civilized life makes it inconvenient to follow this instinct as

promptly as, for instance, a horse does. The impulse to go to stool, if neglected even five minutes, may disappear. There are few health measures more simple and effective than restoring the normal sensitiveness of this important impulse. It may require a few weeks of special care, during which cold water enemas at night, following evacuation by paraffin oil injection, may be needed. It would be an excellent rule to visit the closet immediately after the noon and evening meals, as faithfully as most people do after the morning meal, until the reflex is trained to act at those, the most natural, times for its action.

Before leaving the subject of intestinal poisoning, we may here again mention the importance of avoiding the poisoning which comes from too much protein. This poisoning is probably due largely to the decomposition of protein in the colon. A low protein and an anti-constipation diet is the remedy. Sour milk tablets are not now thought of much benefit. Any form of milk, because of its milk sugar, seems effective in promoting a healthy bacterial growth in the in-

testine, especially when used in liberal quantities.

Section II—Posture

One of the simplest and most effective methods of avoiding self-poisoning is by maintaining an erect posture. In an erect posture the abdominal muscles tend to remain taut and to afford proper support or pressure to the abdomen, including the great splanchnic (abdominal) circulation of large blood-vessels. In an habitual slouching posture, the blood of the abdomen tends to stagnate in the liver and the splanchnic circulation, causing a feeling of despondency and mental confusion, headache, coldness of the hands and feet, and chronic fatigue or neurasthenia, and often constipation.

A slouching attitude is often the result of disease or lack of vitality; but it is also a cause.

Many persons who have suffered for years from the above-named symptoms have been relieved of them after a few weeks of correct posture, sometimes reenforced by the artificial pressure of an abdominal supporter and

by special exercises to strengthen the abdominal muscles.

Breathing exercises are also very useful for correcting the chronic evils of bad posture. Exercises taken when lying on the back, by raising the legs or head, strengthen the abdominal muscles. Slow, deep breathing, through the nose, while lying on the back, with a weight on the abdomen, such as a bag of sand—2 to 4 pounds—is beneficial.

In walking, the most common error is to slump, with the shoulders rounded, the stomach thrust out, the head thrust forward, chin up, and the arms hanging in front of the body. To those who walk or stand in this fashion, let it be known that this is the "habitus enteroptoticus," or the asthenic droop. It is characteristic of those with weak muscular and nervous systems.

To set the shoulders back and square them evenly, to keep the chest high and well arched forward, the stomach in and the neck perpendicular, like a column, and the chin in, are simple fundamental measures that most people know and many people disregard.

The perfect physical poise which places the muscles, organs, circulation, and even the brain and nervous system in harmonious relationship, adjusted for the best achievement, is well expressed in sculpture dating back to 500-600 B. C., when the Spartans attained supremacy in Greece. The same poise and symmetry are shown in modern sculpture of fine types of manhood and womanhood.

It is not enough to have an erect carriage and a well-poised head. We must also have well-directed feet. It is pitiable to note how the work of a fine head may be marred by neglected feet. Weak foot, and its final stage, flat foot, are more common among women than they are among men, because it is not a purely local condition in the arch of the foot, as so many suppose, but primarily due to a general weakened condition of the muscles that support the arch. The more vigorous exercise of boys as compared to that of girls protects them in some degree from this malady.

Weak feet are gradually converted into flat feet (broken arches) by faulty standing and walking posture and lack of leg exercise. Toeing out,

whether walking or standing, so commonly noted among girls and women, places a great strain upon the arches of the foot. The correction of this fault by persistent toeing in, Indian fashion, and daily exercise of the toes and fore part of the leg will do much to prevent flat foot.

In sitting at a desk or table, when reading or working, the common fault is to adopt a sprawling attitude, with the shoulders hunched up, the elbows stretched outward, the body too far away from the desk or table, and the weight resting on the buttocks. Very often the desk or table is too high and the arms cannot rest easily upon it, thus causing a continuous strain on the structures around the shoulder-joints.

To correct this fault, use if possible a chair with a back that curves forward. Sit well back in the chair, but close to the desk, so that the fleshy inner part of the forearms may rest easily upon its surface without pushing up the shoulders.

When it is necessary to lean over a desk, acquire the habit of inclining the body forward by bending at the hips and not by distorting the chest.

The arms should hang easily from the shoulder and the elbows should not rest upon the table. The shoulders should be evenly square, as in the correct standing posture. In right-handed people, the light should fall over the left shoulder or directly from above. The body should rest upon the full length of the thighs, not solely on the buttocks, and the feet (not legs) be crossed and resting lightly on the ground on their outer edges. In other words, the position should be freed from strain, especially strain of special groups of muscles.

Pains, erroneously ascribed to rheumatism or sciatica, are often due to faulty posture. Writer's cramp and many other needless miseries are caused by neglect to develop proper postural habits in working or reading.

A correct posture is attractive from an esthetic point of view, and for that reason is sure again to become fashionable with women, after a due reaction from the present slouching vagary. It is also closely associated with self-respect. We know that any physical expression of an emotion tends reflexly to produce that emotion. Therefore, not only does self-respect natu-

rally tend to brace a man's shoulders and straighten his spine, but, conversely, the assumption of such a braced-up attitude tends to "brace up" the man's mind also. Tramps and other persons who have lost their self-respect almost invariably slouch, while an erect carriage usually accompanies those feeling their respectability. We jokingly refer to those whose self-respect verges on conceit as "chesty," while we compliment one who is not so extreme by saying, "He is no slouch."

Between the slouch and slink of the derelict and the pompous strut of the pharisee, or the swagger of the bully or the dandy, there is the golden mean in posture; in other words, the "military bearing," which stands for self-respect and self-confidence, combined with courtesy and consideration for others.

Section III—Poisons from Without

The poisons which hitherto have been mentioned are those developed within the body, especially in the intestine. It is not alone important to keep down the total amount of poisons

produced within the body. It is equally important to exclude the entrance of any additional poisons from outside.

Among the poisons which must be kept out of the body should be mentioned habit-forming drugs, such as opium, morphine, cocain, heroin, chloral, acetanilid, alcohol, caffein, and nicotin. The best rule for those who wish to attain the highest physical and mental efficiency is total abstinence from all substances which contain poisons, including spirits, wine, beer, tobacco, many much-advertised patent drinks served at soda-water fountains, most patent medicines, and even coffee and tea. Many so-called patent or proprietary medicines contain habit-forming drugs, especially morphine, coal-tar preparations, caffein, and alcohol, and depend largely for their sale upon the effects of these harmful substances.

For some persons the inevitable mode of improvement will be by substituting the milder drugs for the stronger—beer for spirits, weak tea for beer. The exact extent to which the milder poisons are injurious has not yet been scientifically settled. Tea,

for instance, if very weak and used moderately, is, presumably, not injurious to any marked degree to healthy persons. The trouble is, however, that sensitive people do not keep moderate. In fact, the natural tendency of drug-craving is in the opposite direction, from weak drugs to strong ones, as from beer to spirits. In actual fact, it is much easier to abstain than to be moderate. It should also be noted that the lax spirit in which many people make an exception to the rules of health in favor of some mild indulgence is very likely to lead to the making of many other exceptions until they are, without knowing it, carrying a heavy load made up of scores of little items of harmful indulgence. Moreover, experiments at the Pasteur Institute have shown that the long-continued use of very minute doses of poison ultimately produces appreciable harm. Each person must decide for himself how far he chooses to depart from previous habits or common customs for the sake of physical efficiency. The object here is to state exactly what, in our present state of knowledge, is believed to be the truth.

Those with feeble digestions or unstable nervous systems are especially harmed by these poisons. A family history of nervously inclined people calls for rigid care in such matters.

Scientific experiments have resulted in the interesting discovery that the alleged "strength" obtained from beer, ales, and all intoxicating beverages is a delusion and a snare. The poison simply gives a temporary feeling of greater strength through paralysis of the sense of fatigue. But the strength does not exist. On the contrary, the user of alcohol in excess is weaker after taking it. Special classes of workmen have been tested as to their efficiency under liquor in small amounts and without it entirely, and it was invariably found that the liquor was a handicap, but that, also invariably, the workmen *thought* they could work harder by its aid! Alcohol numbs the sense of fatigue and so deceives the user. It is not a stimulant but a narcotic. The habit of taking a cocktail before meals is doubly harmful, because it is often taken on an empty stomach and because it poisons the system more quickly than when

mixed with food and retained in the intestines.

Dr. Stockard has also shown in mice, on which he has experimented, that the effect of alcohol on the germ-plasm is distinctly injurious. It is a fair inference that the use of alcohol by parents tends to damage their offspring.

The evils of tobacco have not been so much studied and are not so well understood as those of alcohol. (Important evidence on this subject is found in Chapter I, Section IV.) But every athletic trainer observes that the use of tobacco lessens physical fitness. The ordinary smoker is unconscious of this and often denies it. He sometimes says, "I'll stop smoking when I find it hurting me; it doesn't hurt me now." The delusive impression that one is well may continue long after something has been lost from the fitness of the body, just as the teeth do not ache until the decay has gone far enough to reach the nerve.

Infections enter the body through the skin or mucous lining. The common cold is believed to enter by the nose. We may avoid exposure to infection from grippe and common colds by keeping away from congested

public places when there is an epidemic of grippe or colds, or when we are ourselves fatigued or for any reason likely to catch cold.

The infections of common colds are always to be found in the nasal passages and become active when the individual is subject to fatigue or indigestion or both. The liability of catching cold is greater when the mucous lining is injured. Nasal douches are injurious and impair the protective ability of the mucous membrane. They should be used only on prescription. A very gentle, warm spray of weak salt and water may be used when the nose is filled with soot and dust. The fingers should be kept from the nose. Handkerchiefs should be frequently changed, or small squares of gauze used and subsequently burned.

The germs of tuberculosis may be inhaled from sprayed moist sputum or from dried sputum. Scientific opinion now favors the view that children are often infected by contaminated milk through the digestive tract. Destruction of the sputum of consumptives, and protection of the milk supply, sanitary dairies, exclusion of tubercular

cows, and pasteurization of milk, are important preventive measures.

Raw milk also may convey germs of septic summer complaints.

Suitable wire netting will guard us from malaria and yellow fever, the infections brought by mosquitoes and flies. As some one has said: "A yard of screen in the window is better than a yard of crape on the door." The greatest triumph in connection with the building of the Panama Canal was not the engineering but the reduction in the death-rate among the workers, which, on account of these insect-borne diseases, had previously prevented the successful execution of the undertaking.

Not only is it desirable to screen from mosquitoes, but to put oil on any body of water where they breed. Even a small puddle can breed millions of mosquitoes. No empty tin cans should be allowed to collect about the kitchen door; they gather rain-water and soon breed mosquitoes.

We take in many disease germs through food or drink. Every year 300,000 people in the United States enlist under the typhoid banner. To elude the typhoid-germ we need first

of all pure water. But when one is in doubt as to the purity of water, it is advisable to boil water in order to destroy possible typhoid germs and other dangerous germs and impurities. Where hygienic water has been used a very large proportion of the deaths from typhoid has been eliminated. Where this is not feasible, it is desirable to use chlorinated lime (ordinary bleaching powder) in the drinking water (one part to 200,000—shake up and leave several minutes). If water of doubtful quality has to be drunk, it should be at the middle or end of a meal when the healthy stomach contains plenty of gastric juice, which to a limited extent has the power to kill germs.

It is safer to keep out of swimming tanks that are not filtered or refilled constantly, or chemically purified as by chlorinated lime.

Another measure for avoiding typhoid is to pasteurize milk. Food that is liable to contain typhoid or other dangerous germs, such as raw oysters, and milk from typhoid-infected localities, should be avoided.

Preventive typhoid inoculation offers, of course, a practical, complete

protection and is an excellent rule in the United States Army.

In protecting the food against all kinds of impurities which injure the body, we must remember that the carrier of typhoid fever, the common house-fly, deposits typhoid germs on the food, through which the germ is taken into the system. The most effective method of fighting flies is by preventing their breeding. Their favorite places for this are horse-manure, but they will breed in almost any mass of fermenting organic material. Manure piles and stables should be screened, and the manure removed at least once in seven days. Garbage-pails should be kept tightly covered. Fly-paper and fly-traps should be used. Houses should be screened, and, in particular in the pantry, the food itself should be screened. Flies are usually thirsty in the morning. By exposing a saucer of one per cent. of formalin solution, the flies will be tempted to drink this morning cocktail and pay the death-penalty.

Ticks should also be carefully exterminated, as they are sometimes responsible for such diseases as Rocky

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lean, especially before meals. Any
t or crack in the skin or mucous
embrane may let in germs when the
ot is dirty or is touched by dirty
nds. This is why surgeons are so
upulously clean. Super-cleanliness
obably also explains the extraordi-
rily low mortality of Jewish rabbis
a class.

The need of cleanliness is particu-
rly great for those who work in fac-
ries, mines, and other places where
irt is likely to be carried to the mouth
y the hands. Probably many diseases
et a foothold in this way without the
ictim realizing in the least that they
ere due to his carelessness and lack
f cleanliness.

Cleanliness is promoted by perspi-
ing prior to bathing. Everyone knows
he exhilaration which follows a
ealthy perspiration. Of course, the
ost beneficial method of securing
erspiration is the method applied to
he trotting horse—vigorous exercise.
weating may be overdone, and should
ever be pushed to the extent of ex-
austion. The function of the skin in
emoving wastes from the body is
uch less important than formerly
pposed. It should be remembered

that all of us perspire insensibly as well as visibly.

Some of the most serious and widespread although usually unmentioned infections are those from the venereal diseases, with a whole train of terrible consequences, such as blindness, joint-diseases with heart-complications, peritonitis, paralysis, and insanity. They are to be avoided by living a life hygienic and clean, not only in body but in mind and heart. From even the narrowest interpretation of hygiene, a decent life is necessary for the maintenance of health. This is a special subject on which most people are extremely ignorant. It is seldom realized, for instance, that *all prostitutes are diseased.* This was found to be the case in an investigation in Glasgow.

Dr. Rosenau says: "Every boy and girl, before reaching the age of puberty, should have a knowledge of sex, and every man and woman before the marriageable age should be informed on the subject of reproduction and the dangers of venereal diseases. Superficial information is not true education. On the other hand, it is a mistake to dwell unduly upon the subject,

for in many instances the imagination and passion of youth are inflamed by simply calling attention to the subject."

The Life Extension Institute can furnish special pamphlets covering this important topic.

The loss of citizens to the State from the sterilizing influence of gonorrhea upon the productive energy of the family, and the blighting destructive effect of syphilis upon the offspring offer extremely serious problems for preventive work.

Section IV—Teeth and Gums

There is one source of poisoning and infection so universal as to need special mention. This is infection through the mouth. Considered from the standpoint of efficiency, the modern mouth is out of adjustment with modern conditions—or, perhaps we should say, modern conditions are out of adjustment with it. Notwithstanding the numerous bacteria that flourish within its portals, mouth secretions and the mucous membranes do not seem to have the protecting power which is often manifest in other re-

gions of the body and which protects an animal in a state of nature. Wild animals are not subject to dental decay, as are man and domesticated animals.

There are two forms of mouth-danger that should be clearly differentiated. Dental decay is at first largely a chemical process and affects the tooth proper. Pyorrhea, or Riggs's disease, affects the tissues surrounding the root of the tooth, and is accompanied with infection by pus bacteria, and possibly also by animal parasites, termed endameba. Scrupulous cleanliness of the mouth largely prevents both of these maladies.

In dental decay, plaques or films of mucin from the saliva form on the tooth surfaces and enclose bacteria and particles of carbohydrate food, which undergo fermentation with the formation of lactic acid, which dissolves the lime salts on the surface of the teeth, leaving only the organic matter. This organic matter is then attacked by bacteria. Putrefaction sets in, and you have a cavity. This cavity is of course a menace, as it harbors various forms of bacteria which may infect the general system

through the root canals, or the digestive system by being swallowed with the food, and also gives rise to abscesses at the root-tips.

Pyorrhea is an infection of the gums or tooth-sockets. It begins beneath the edges of the gums that have been injured and especially where there has been an accumulation of tartar or lime-deposit. As the infection progresses and destroys the membranes that attach the root of the tooth to the socket, a pocket is formed around the root, and the tooth becomes loosened. It is said that this disease is responsible for far more loss of teeth than is decay.

But this is not the only evil. In the pocket pus is continually being formed and discharged into the mouth and swallowed. Also, as the teeth rise and fall in their diseased sockets in ordinary chewing, bacteria are forced into the circulation and may be carried to distant parts, where they work harm according to their nature, selecting tissues for their operation in which they can best thrive. The blood abscess or the infection at the root tips is, however, the most dangerous form

of infection, and often passes unrecognized, unless the teeth are X-rayed.

It was formerly supposed that the ill effects from such conditions as dental abscess and other pus foci were wholly due to the toxins or poisonous products thrown into the blood-stream by the bacteria at the focus. It is now known, however, that the bacteria migrate into outside tissues through the blood- and lymph-streams. In joint affections, they clog and obstruct the small blood-vessels, interfering with the nutrition of the joint-tissues, causing deformity and enlargement, as well as in acute inflammation, such as rheumatic fever. Indeed, this condition of subinfection, or "focal infection," is coming to be recognized as a far more important cause of disease than the time-honored autointoxication, a term which has been greatly abused and misused.

Not all the ills that flesh is heir to are caused by mouth-infection, but enough of them are to more than justify a vigorous and world-wide campaign for the better care of the teeth and for a thorough search for mouth-infection by X-ray examination in every case of obscure disease.

Gum infection is not always due to conscious neglect. Some people do not know how to properly cleanse the teeth. Others have tissues of low resistance, and need to give extra care to tooth- and gum-cleansing under the closest dental supervision. Others have spent large sums for dental work that has filled the mouth with crowns and bridges difficult to keep aseptic or sugically clean. There are various means which the individual can use to prevent or cure these dental evils.

First, the importance of thorough attention to general personal hygiene, in order that a general resistance to mouth-infection may be built up, cannot be overemphasized.

The cultivation of normal eating habits with respect to the vigorous use of the jaws by thorough mastication, and the eating of hard, resistant, crusty foods every day is the next desirable means of tooth and gum hygiene.

A leading dentist expresses the hope that some day the human animal, like other animals, will, through a correct diet, be able to get along without the aid of the tooth-brush; but he adds that, in the meantime, we need to ad-

vocate more tooth-, gum- and tongue-cleaning rather than less. They should be cleaned night and morning and after each meal if possible by rapid rotary brushing. Strong pressure is not advisable. Rapidity of movement is the important point. This stimulates the circulation and increases the resistance of the gums and cleanses the teeth at the gum margins from the accumulations of tartar which are at first soft and easily removable by a brush.

The tongue should also be carefully cleansed with the tooth-brush. By taking care not to hit the roof of the mouth, gagging is avoided.

Periodic examinations and cleanings by the dentist are the only safe measures. If the dentist has facilities for giving *preventive* treatment by specially cleaning the teeth, he should be visited every other month. If such a program is adopted, it will generally be found unnecessary to visit him for any other purpose.

Some dentists and physicians have until lately given too much attention to the saving of teeth, without fully realizing the dangers of infection from the mechanical devices employed. The

teeth should not be extracted on mere suspicion and without proper effort to save them, but it is far more important to save a heart or a kidney or a set of joints than it is to save a tooth. This is not to say that all bridge- and crown-work is improper, but that such work should only be of a character that will permit of surgical cleanliness in the mouth, and that such teeth should always be examined by the X-ray, when there is evidence of systemic disease, in order to be sure that the roots and sockets are not infected.

CHAPTER V

ACTIVITY

Section I—Work, Play, Rest and Sleep

In order to live a hygienic life it is not only necessary, as shown in the foregoing chapters, to supply the body with wholesome substances and to exclude unwholesome substances, but it is also necessary that the body should at times act, and at other times be inactive. There are two great forms of activity, work and play; and two great forms of inactivity, rest and sleep. All four of these are needed in the healthy life and in due relation to each other.

It is distinctly unhealthful either to overdo or to underdo work, play, rest, or sleep. "Moderation in all things" is a rule that is particularly important in this realm. Not all people are in need of exercise, nor are all in need of rest; but almost every one needs to change his proportion between the two. To-day many people are suffering from too much or too little work. For instance, the increase in diseases

of the heart is often due to nervous overstrain combined with either too much or too little physical exertion.

The remedy for the evils of idleness is obviously to find some useful work which will inspire real interest and enthusiasm. There are few things more necessary to a normal healthy life than to have purposeful work. A great dream or ambition in life often obviates personal ailments and nullifies their potency. Work, when done with zest, is a wonderful tonic. Exertion of any kind is usually pleasurable at first, and becomes drudgery only when too far protracted.

Normal work is one of the greatest blessings of life, but too many miss the joy of it, some because their work has gone to the extreme of drudgery and others because it has shrunk into nothingness and futility. Sometimes people become ill because their personality, hungry for work, is given nothing but introspection to feed upon. This is the self-imposed curse of the idle rich.

Working hours should be so arranged as to enable the worker to fully recuperate overnight, partly from sleep and partly from the recrea-

tion enjoyed in leisure between work and sleep.

Variety of work is especially needed in modern times, when specialization tends to lead men to extremes. Changes in work which prevent a sense of monotony will greatly increase the power to work. A clerk will do more work, and do it more effectively, if he is occasionally allowed something else to do than to foot up columns.

If the monotonous strain of performing numerical additions is interrupted a few times daily, the adding faculty of the brain is given much needed rest. Many men in the higher rank of workers complain of the many interruptions which they suffer, but if they would welcome these interruptions instead of allowing themselves to be irritated by them, each interruption would serve the purpose of a vacation. It is in this way that some of the greatest workers, like Gladstone, have been enabled to accomplish so much.

The strain of modern life is sometimes special rather than general. Often the strain comes on some one muscle or organ. Modern industry is

so constituted that the individual strains one part of the body while other parts are in need of exercise.

One of the organs which is most commonly strained in modern life is the eye. In its modern use, the eye is constantly focusing at a short distance. To look at the horizon is a rest. The reflex evils from eye-strain are great and numerous and are often incorrectly ascribed to entirely different causes. Headaches, nausea, and dizziness are especially frequent results of eye-strain. Probably some of the breakdowns in middle life are due primarily to the reflex effect of eye-strain.

Eye-strain is to be prevented by scientifically adapted spectacles, by care to secure the right kind of illumination, and in some cases by systematically resting the eyes. Reading on moving trains or looking for a long time at moving pictures may overstrain the eye. One should be especially careful not to read in a waning light or, on the other hand, to read in the glare of the sun.

To offset the evils of a sedentary life, it is advisable to spend one hour

daily, or at least 15 minutes, in some kind of vigorous physical exercises.

The rowing-machine is probably the most beneficial form of mechanical home exercise that is likely to be followed faithfully. Simple stretching in bed when one wakes up is helpful, especially if combined with breathing exercises.

The most beneficial exercise, as a rule, is that which stimulates the heart and lungs, such as running, rapid walking, hill-climbing and swimming. These should, of course, be graduated in intensity with varying age and varying degrees of vitality.

Gentle muscular activity after meals promotes normal digestion and should be practised for a quarter or half an hour after each meal, but violent exercises immediately after meals should be avoided, as a large amount of blood is then engaged by the digestive system.

A very important fact for the average man to take into consideration is that, whereas he naturally gets considerable out-of-door exercise in summer, he allows it to lapse in the winter. Such a decided change in the amount of exercise is dangerous and

should be avoided by taking regular gymnasium exercise. Even though a gymnasium is not elaborately equipped, use can be made of such games as hand-ball, volley-ball and other available games. Setting-up exercises performed to the music of a Victrola are almost as attractive as dancing.

But, although exercise when self-imposed is wholesome, exercise to which one is naturally attracted is more so. Golf, horse-back riding, tennis, usually inspire enthusiasm, and enthusiasm itself is healthful. Walking may also do so, if the walk has an object, as in mountain-climbing, when often the artistic feelings may be enlisted in the sport. Working out an ideal stroke in rowing, perfecting one's game in polo or other sports, are other examples.

The Greeks lifted their sports to a higher level than ours by surrounding them with imagination and making them a training in esthetics as well as in physical excellence. The American idea is too closely connected with the mere wish to win and the performance of mere "stunts" and not enough with the idea of beauty of

physique and control of the body. There is accumulating considerable evidence that college athletics often seriously injure those who engage in them, although they were originated and encouraged for precisely the opposite effect. The value of exercise consists not in developing large muscles nor in accomplishing athletic feats, but in attaining physical poise, symmetry of form, and the harmonious adjustment of the various parts of the body, as well as in furthering the proper activity of cell-tissues and organs and the elimination of waste products.

Not only the functions of the body but those of the mind require exercise—exercise in thinking, feeling, and willing. A person who does not read or think loses some of his ability to read or think. The physical worker, for instance, often allows his mind to become dull and sodden. The accountant adds up figures all day and has no chance to exercise his judgment or other mental faculties. In the same way a person who does not exercise his artistic, poetic, or affectional side will suffer its atrophy. The plaint of Darwin that he had allowed his taste

for music and poetry to atrophy could to-day be made by many intellectual specialists. Good music is especially healthful.

Since the work of most people is likely to produce some unhygienic element which can not be avoided, a compensation should be sought in an avocation or "hobby," to be practised out of regular working hours. The avocation should be far removed from the nature of the regular work. Often the avocation can serve a productive purpose. Gladstone and Horace Greeley sawed wood or chopped down trees for recreation. A well-known engineer divided his recreation between writing stories and painting pictures.

It is best for the average individual to avoid literature that deals with the morbid and pathological, that depicts and analyzes abnormal psychological conditions. Such studies are better left for alienists. Literature of mawkish sentimentality should also be avoided. Within the range of sound literature there is a wide choice of abundant material affording healthful mental suggestions.

Dancing combines wholesome exercise, social enjoyment, and the ac-

quirement of skill and grace, but it is seldom of much hygienic value because it is frequently overdone, and often involves bad air and loss of sleep. In one large plant where the employes were examined by the Life Extension Institute, the management regarded the harmful effect of dancing as their chief obstacle to efficiency. Many of the large force of girls and women were accustomed to dance until late in the night, bringing on a condition of chronic fatigue.

Card-playing and similar games afford wholesome mental recreation for some persons. However, they, too, are liable to be associated with late hours and other disadvantages even when they do not degenerate into gambling. Card-playing, dancing, and many other popular forms of amusement often go over the border of recreation and become dissipation.

Amusements which weaken and degrade are not hygienic. Many who need amusement make the fatal mistake of getting it in suicidal ways, in the saloons, dives, and the low dance-halls.

Play is simply a half-way stage between work and rest. In a hygienic

life there must be a certain amount of actual rest. Every bodily power requires rest after exertion. The heart rests between beats. The muscles require relaxation after every contraction. The man who is always tense in muscle and nerve is wearing himself out.

The power to relax, when fatigue requires it, is one of the most important safeguards one can possess. Lying down when tired is a good rule. A very hard-working college president when asked about the secret of his working-power and length of life replied, "My secret is that I never ran when I could walk, never walked when I could stand, never stood when I could sit, and never sat when I could lie down."

Such rules as these are valuable, of course, only when the requirements of one's occupation tend toward ceaseless activity. For idle and lazy people the rule should be reversed—never to lie down when one could sit, never to sit when one could stand, never to stand when one could walk, and never to walk when one could run! A complete life must have all in due proportion.

Relaxation is only a short vacation, as it were, between two activities.

Bathing and swimming supply, in their numerous forms, examples of both healthful activity and relaxation. A cold spray or shower, alternated with hot, affords excellent gymnastics for the skin. A very hot bath, lasting only a minute, or even a hot foot-bath, is restful in cases of general fatigue. The most restful of all is a neutral, that is, tepid, bath of about the body-heat (beginning at 97 or 98 degrees and not allowed to drop more than 5 degrees and continued as long as convenient).

Exercise taken in the afternoon will often promote sleep at night in those who find sleep difficult. Slow, deep, rhythmic breathing is useful when wakeful, partly as a substitute for sleep, partly as an inducer of sleep.

One's best sleep is with the stomach practically empty. It is true that food puts one to sleep at first, by diverting blood from the head; but it disturbs sleep later. Water, unless it induces bladder-action during the night, or even fruit, may be taken without injury before retiring. If one goes to bed several hours after eating he can

often get along well with six or seven hours' sleep, but if he goes to bed soon after a hearty meal, he usually needs from eight to ten hours' sleep.

It has already been pointed out that sleeping outdoors is more restful than sleeping indoors.

A pillow is not a necessity if one sleeps lying prone with one arm extended above the head and the leg opposite drawn up. This sleeping attitude can easily be reversed to the opposite side. It has one advantage over pillow-sleeping, that of not tending to round shoulders. This prone position is often used now for infants, but is seldom enjoyed by adults.

Section II—Serenity and Poise

As we have seen, not only the body but the mind needs its due activity and rest. As to the mind, the important question is the quality of the activity rather than the quantity. If we are to be really healthy, our mental attitude must be healthy. A healthy mental attitude implies many elements, but they are all roughly summed up in the word "serenity." Probably no other one hygienic re-

quirement is of greater importance than this. Moreover, the attitude of "healthymindedness" should be striven for not only in order to produce health, but as an end in itself, for which, in fact, even health itself is properly sought. In short the health of the body and the health of the mind act and react on each other.

We may generally keep serene through following the other measures already described. Discontent is undoubtedly very often the consequence of wrong conditions in the body, and though melancholy, worry, peevishness, fear generally appear as arising from outward conditions, there are usually real physical sources, existing within the body itself. These are at times most difficult of recognition. A person who is physically ill is likely to be ill-satisfied with everything, without suspecting the fundamental cause of the discontent. When the apparent "cause" is removed, the discontent remains none the less, and fastens itself on the next thing that comes along.

Although some little event such as the mistake of a tradesman or a cross word of a friend may seemingly

"cause" a disagreeable reaction in a man if he is ill (whether he knows he is or not), the same "cause" does not necessarily produce that same reaction at all times. When he is in a healthy mood, the "cause" may be entirely inadequate to bring about the same result.

The near approach to the menstrual period in women is often accompanied by mental depression and physical fatigue which it is almost impossible for the sufferer to recognize at the time as caused by anything but "real" or outside misfortunes.

Other physical conditions act in the same way. The hidden cause may be constipation, eye-strain, or the effects of alcohol or other drugs, a sedentary life, a bad posture, or weak abdominal muscles; and the proper remedy may be an enema, a pair of glasses, a vigorous swim, deep breathing exercises or an abdominal supporter, an erect carriage or a general change of daily habits. A young man returning from a surveying trip in the mountains of Colorado in which an ideal hygienic out-of-door life was lived, said, "I never saw so good-natured a crowd of rough men. Nothing ever seemed to

make them angry. They were too full of exultant health."

"Give me health and a day," said Emerson, "and I will make the pomp of emperors ridiculous."

But what most concerns us in this section is that the mind has an important influence over the condition of the body. A Kansas poultryman, who owns a hen which he claims to value at $10,000 because of her qualities as a breeder, a few years ago knew a great deal more about how to maintain the health of his poultry than he did about how to maintain his own health. Long and bitter experience had taught him that he obtained freedom from sickness among hens only by being very careful to feed them on a special diet; to give them drinking water at regular intervals—warmed in winter; to supply them with well ventilated and cleanly houses, and so on. But, after all this, he found there was one condition, which, if unfulfilled, still precluded the realization of maximum possibilities. "A discontented hen won't lay eggs," was the startling discovery. "When I see a man go into the yard and 'holler' loudly at the hens, and wave his arms, making them

scatter, frightened, in all directions, I say to that man: 'You call at the office and get your pay and go.' But when I see a man go into the yard, and call gently to the hens, so that they all gather around him and coo and cluck and eat out of his hand, I raise that man's pay."

It can not be too much emphasized that mental perturbation affects the body in many ways. Joy fills the cheeks with blood. Fear drives the blood away. Excitement quickens the heart-beat. Grief brings tears, the reaction of glands about the eyes, and sighs, the disturbances of regular breathing. A great shock to the mind may cause fainting, the rush of blood from the head into the abdomen. Worry will interfere with digestion and sleep. The X-ray has detected the arrest of the peristaltic movement of the stomach and intestines because of a strong emotion. Some peculiarly constituted people, who take their work and obligations with a kind of seriousness that amounts almost to fear, can not eat anything of consequence until their day's work is ended. The digestive processes seem to be at a standstill until then. A curious fact

is that strong emotion may lead to a great increase in the sugar in the blood, sometimes enough to cause its appearance in the urine as though the person had diabetes. One man expresses this by saying, "bitterness of soul banishes sweetness even from the body."

There is in fact a danger to which some people are especially subject—the danger of becoming hypochondriacs from paying too much attention to physical hygiene. Such a person becomes fearful lest he is not doing exactly the right thing. He looks supiciously at every article of food and fears that it will disagree. He fears that he has strained his heart; he worries over the loss of an hour's sleep; he chafes because his employer has not given him a vacation at the right time or of the right length. The hypochondriac thus neutralizes practically all the benefit of other hygienic measures by disregarding this special measure of keeping serene. It might, in many cases, be better to disregard some rules of hygiene than to worry over them.

On this theory the devotees of mind-cure cults have derided every hygienic

measure but one—their "mind-cure." They sometimes succeed in the "real cure of imaginary ailments," and the "imaginary cure of real ailments." In the latter case, the mental contentment lasts only until the real ailment becomes too aggressive to be ignored. But it is a great mistake to stake everything on the simple resource of mental equanimity. In some cases it is criminal, as, for instance, to refuse surgery for cancer, or outdoor living for tuberculosis.

It would seem that incessant, even if mild, worry is more exhausting than occasional fits of intense anger or fright or overexcitement, just as we waste more water from a spigot left slightly open all the time than from one which is alternately closed and wide open. Worry, if unceasing, will often drain away the largest store of nervous energy. Worry seems, as it were, to short-circuit nerve currents in the brain, which normally form a long circuit through the body. One man, with this simile before him, has found he can stop worrying almost at will, avoid the supposed continuous short circuit and save up his nervous energy until it is needed.

[illegible] as they [illegible] be worse! If we [illegible] we should be sure- [illegible] the things [illegible] really happen. [illegible] "half the [illegible] even in war-

[illegible] himself how [illegible] fear, worry, ex- [illegible] jealousy, grief, [illegible] abnormal mental [illegible] which must [illegible] or bicycle- [illegible] be imparted merely [illegible]

[illegible] is often the [illegible] maintaining [illegible] insuperable, the [illegible] by "living [illegible]." Almost any one [illegible] of adversity [illegible] her power, for [illegible] at any rate one [illegible] to eliminate the [illegible] to take pos- [illegible] expiration of say the [illegible] same power can [illegible] the next ensuing [illegible] one is caught

napping, after which he must pick himself up and patiently try again.

In modern life, which has been gradually speeded to the breaking-point, many people are suffering from a constant oppressive sense of hurry. Most people have "so much to do," that they cannot do it. This fact is of much annoyance and at the same time spurs them on in the vain endeavor to catch up. When once it is realized that the sense of hurry actually reduces the effective speed of work—in other words, that "the more haste, the less speed"—the situation has been reached in which the individual can teach himself some practical philosophy.

An immense help in the field of mental hygiene is to be obtained from religion and philosophy, although this is not the place to advocate any particular form of either, and from the standpoint of hygiene, it does not greatly matter. One may get his chief help from the Bible, from faith-healing cults, from writers like Emerson, from Tagore and other Orientals, or from Marcus Aurelius and Epictetus.

Professor William James commends the adoption of a "religion of

healthymindedness" in which we renounce all wrong or diseased mental states, cultivating only the healthy ones, such as courage, patience, optimism, and reverence.

When the mind turns from shadow to sunshine, the body will tend also to assume the radiance of health. Stevenson said that there is no duty we so much underrate as the duty of being happy. The habit of being happy enables one to be freed, or largely freed, from the domination of outward conditions. Though the trait is apparently totally lacking in some, while existing to a high degree in others, experience has shown that conscious cultivation will develop it to an appreciable degree, even in very stubborn cases. As in little Pollyanna's "Glad Game," it is possible to find something to be glad about in every situation in life.

The secret of equanimity consists not so much in repressing the fear or worry, as in *dropping* or ignoring it—that is, diverting and controlling the attention. It does no good to carry a mental burden. "Forget it!" The main art of mental hygiene consists in the control of attention. Perhaps the

worst defect in the Occidental philosophy of life is the failure to learn this control. The Oriental is superior in such self-training. The exceptional man in Western civilization who learns this control can do the most work and carry the most responsibility. On much the same principle as the Indians used when their young men were trained to endure pain self-inflicted, we might well devote a few minutes each day to the difficult task of changing at will our attention from the thing which is engrossing it to anything else we choose; or, what is more difficult still, to blank nothingness. When we have sufficiently strengthened this power, we can turn off the current of our thoughts as we turn off the lights and lie down to sleep in peace, as a trained sailor does in a storm.

A business man who had set his heart on fulfilling a large responsibility nearly wrecked his health from worry over the outcome. His wise physician prescribed that, before sitting down to his desk each day, he should spend five minutes repeating and impressing on his mind the words, "I don't give a hang! I don't give a

hang!" The truth is many people fail because of overanxiety lest they fail. Some invalids die from an exaggerated desire not to die.

The force of habit is much stronger than most people realize, and makes it difficult, especially at first, to effect a change. Later, as partial successes become more frequent, the benefit of habit is gradually transferred to the other side, becoming a help instead of a hindrance.

A helpful precept, when one is failing in some crucial undertaking from his very overanxiety to succeed, is to replace the ambition to succeed by a determination to pass the crisis unruffled, whether one succeeds or fails, "He that ruleth himself is greater than he that taketh a city," and incidentally if we rule ourselves we are far more likely than otherwise to take the city, if that be possible at all.

An ideal course of conduct implies a constant readiness, after all has been done which can be done, to renounce one's feverish desires and accept whatever higher powers decree, even if it be death. This is one of the supreme aims of every great philosophy or religion. The Psalmist said,

"Though He slay me, yet will I put my trust in Him," and Christ exclaimed, "If it be possible let this cup pass from me; nevertheless, not as I will, but as Thou wilt."

CHAPTER VI

HYGIENE IN GENERAL

Section I—The Fifteen Rules of Hygiene

THE aids to health discussed in the preceding chapters may be summarized in specific formulas classified under the four heads, Air, Food, Poisons, and Activity, corresponding to the four chapters, and under fifteen subheads, corresponding to the fifteen sections.

I. AIR.

1. Ventilate every room you occupy.
2. Wear light, loose and porous clothes.
3. Seek out-of-door occupations and recreations.
4. Sleep out, if you can.
5. Breathe deeply.

II. FOOD.

6. Avoid overeating and overweight.
7. Eat sparingly of meats and eggs.
8. Eat some hard, some bulky, some raw foods.
9. Eat slowly.

III. Poisons.

10. Evacuate thoroughly, regularly and frequently.
11. Stand, sit and walk erect.
12. Do not allow poisons and infections to enter the body.
13. Keep the teeth, gums and tongue clean.

IV. Activity.

14. Work, play, rest and sleep in moderation.
15. Keep serene.

To apply these rules with precision and according to individual needs, it is quite necessary to have the body thoroughly examined at least once a year, as each one should vary the rules to meet his own particular shortcomings. The most practical method is for the individual to begin the improvement he would seek by constructing a typical day's program in which time is provided for, say, breathing and other exercises in bed, bath, toilet, walk to business, meals, amusement, etc., with special notes and memoranda as to the particular faults of omission and commission to be corrected. One might also, as Benjamin Franklin records in his autobi-

ography, keep a daily record for a week or so to see how nearly the program is lived up to. By dint of such stimuli, the transition in habits can be made, after which the "rules" cease to be rules, as carrying any sense of restriction, and become automatic like putting on or taking off one's clothes.

Section II—The Unity of Hygiene

The above rules embody our preachment on individual hygiene. We have stated them as fifteen separate kinds of procedure. In actual life, however, our acts can not be so separated. The neglect or observance of one rule carries with it, to some extent, the neglect or observance of other rules. For instance, one can not take muscular exercise without, to some extent, taking breathing exercises. Swimming serves as a means of cleanliness, of skin gymnastics, of general exercise and of amusement. A game of tennis implies the practise, to some extent, of at least five of the fifteen rules.

The human body is a "harp of a thousand strings," which are intended to harmonize. If one of them is out

of tune, it is likely to cause discord throughout, while to tune up one helps the harmony of all.

It has already been noted that eye-strain leads to an astonishing number of serious nervous affections, and that corrective eye-glasses will often work wonders for remedying those ailments and improving the general health. There may be other unhygienic conditions equally responsible for these symptoms, and the correction of which may produce equally wonderful improvement. Vertigo may be due to eye-strain, or it may be due to wrong posture or to pressure of wax on the ear-drum. Diabetes may be aggravated by too much sugar, by infected tooth-sockets, or by too much worry. Tuberculosis may be due jointly to indoor-living, lack of exercise, wrong diet, wrong posture, sexual excess, alcohol, nerve-strain, and numerous other pre-conditions, besides infection with the tubercle bacillus. The social evil can be fought not only directly by attack on prostitution, and by appeals to self-control and moral ideals, but also indirectly by diminishing the consumption of alcohol and other drugs, for alcohol not only produces abnor-

mal sexual desire but reduces the strength of will by which that desire is repressed. Forel asserts that the social evil can not be controlled until the use of alcohol as a beverage is abolished.

Most people who are "overworked" are, more properly speaking, simply the victims of bad air, bad diet, poisons, or worry. They believe that because they are tired it must be work which is hurting them. The man who breaks down in middle life commonly imagines that he has ruined his health by overwork. The college girl thinks she has ruined her health by study. All these "overworked" people prove their case by showing that they improve in health when given a vacation. This simply shows that a bad condition can often be remedied by improving the general health in any way whatever, even if the primary source of the difficulty is not reached. They are undoubtedly working beyond their working capacity; but their working capacity is only a fraction of what it would be if they took exercise, were not constipated, did not eat too much, abjured alcohol, or ceased to worry continually. If they lived hygienically

in these respects, the work which was a drag might be an inspiration. A physician of wide experience says that every day men come to him broken down in health, invariably telling him that they have overworked; and yet upon questioning them he finds that none of them works as hard as he. Their breakdown was due to the terrible load of unphysiological habits which they had been carrying—a load so great that scarcely any work could be carried in addition.

Other examples might be given of ascribing ailments and disabilities to the less important instead of the more important causes. The error is almost always made of resting the blame on only one cause. In consequence most health-seekers fall into the error of making only one correction in their daily regime of life. One ceases alcohol drinking, another gives up tobacco smoking, another gives up coffee, a third ceases using all "red meats," another turns vegetarian, another adopts a raw food diet, another takes up outdoor sleeping, another adopts a daily game of golf, another embraces a mental healing cult, another takes up mastication. But great and perma-

nent results require the adoption of an all-round, well-balanced regime.

Section III—The Obstacles to Hygiene

The ordinary man, in ordinary good health, does not want or thinks he does not want to live hygienically. He sees all sorts of imaginary objections to adopting a hygienic life, and closes his eyes to its real and great advantages. One of the objections often trumped up is that the practise of hygiene costs too much—that it can only be a luxury of the rich. It is quite true that here, as elsewhere in human life, wealth confers certain advantages. The death-rate among the rich is always less than that among the poor. And yet the rich have unhygienic temptations of their own, while the poor, on their part, are far from living up to their opportunities.

The best things of life we can have without cost.

It costs nothing to stand erect and breathe and walk properly.

It costs nothing to have fresh air in your home.

It costs nothing to do setting-up exercises every day.

It costs nothing to masticate one's food thoroughly; this insures better digestion and less of the expensive highly-flavored food is consumed; money and health are saved.

It costs nothing to cleanse the teeth thoroughly after each meal. By so doing you may save not only dentists' bills, but surgeons' and doctors' bills.

It costs nothing to eat some crusty foods that give proper employment to the teeth and thus save dentists' bills.

It costs nothing to choose the kinds of foods that the body needs.

It costs nothing to keep out of your body substances like alcohol that are known to be injurious.

It costs nothing to adjust your diet so that the more expensive flesh foods are not taken in excess.

It costs nothing to avoid dosing yourself with patent medicines.

It costs nothing to avoid eating, between meals, candy and sweets that have high fuel value, and are liable to irritate the stomach and otherwise affect the digestion and metabolism.

It costs nothing to feed the mind with wholesome mental food instead of trash or morbid literature that

easily decomposes and poisons your whole life.

It costs nothing to keep serene and cheerful; to show "malice toward none and charity for all"; to keep out of the nervous system "grouches" that waste your energies and infect the lives of those around you.

Almost all can allow enough time for meals to eat slowly. Coarse and raw foods are always to be had and are usually cheaper than the conventional soft, concentrated cooked foods. In fact, meat, eggs, and like foods are among the most expensive and the least desirable. If we compare the cost of flour and of the other cheapest food materials, with the cost of oysters, one of the dearest, we find that the latter is fifty times as expensive as the former for the same food value. This takes no account, of course, of the expenses involved in cooking either of them. It has been proved by actual experience, and when prices were abnormally high, that one can live in the best of health on food costing as low as twenty-five cents a day, exclusive of the labor of preparing, cooking and serving. This is possible anywhere in America within fifty miles of a rail-

road. To live safely and healthy on a low-cost diet one must have a knowledge of the simple fundamentals of diet and proper feeding.

Many busy men object to hygiene because, they say, they have no time for it. They imagine that to devote an hour each day to exercise or relaxation is a waste of time and that they are really economizing their time by working that hour instead. We are here referring, not to those who can not control their working-time, but to those who deliberately choose to work when hygiene would require them to play. It is often those who fix their own working-hours, rather than those whose working-hours are fixed for them, who overwork the most. If these could know the suffering which sooner or later follows inevitably as the consequence of this mistaken policy, they would not pursue it for a single day. A slight loss of working-power comes immediately. A careful observer of mental workers found that an hour invested in exercise in the afternoon often pays for itself within a day, by rendering possible more rapid work. He also found an improvement in the quality of his work.

The razor-edge of the mind needs daily honing through physical exercise. The same principle applies to all work. It is just as necessary to stop, at intervals, our physical and mental machinery for oiling and repairs, as to stop the machinery of a factory.

Another objection is that the practise of hygiene is "too much trouble." It is undoubtedly true, that no one who has unhygienic habits can overcome them without a certain amount of "trouble." The people who get the best results are those who are never deterred by trouble so long as the trouble is worth while. For those who have not the necessary enthusiasm or self-control to break their unwholesome habits by sheer will power, the best advice is to so arrange their lives as to make the practise of hygiene inevitable. One physician in Chicago deliberately got rid of his automobile and other means of locomotion in order to force himself to walk to all his patients, and so secure enough physical exercise. Another man in New York City, with the same object in view, selected the location for his dwelling so that there was no rapid transportation available to take him

to his office, making the walking back and forth a necessity from which he could not escape.

The only difficulty lies in overcoming the inertia of acquired habits. After one has changed his habits, it is just as easy to live rightly as to live wrongly. The rules of hygiene are not restrictive, but liberating. They may seem at first restrictive, for they prohibit many things which we have been in the habit of doing; but they are really liberating, for the things we were doing were unrealized restrictions on our own power to work, to be useful, or even to enjoy life. The "rules" of hygiene are thus simply the means of emancipating us from our real limitations. These so-called rules, when tried, will prove to be not artificial but natural, not difficult but easy, not complicated but simple. They are almost as simple as the direction to bathe in the river Jordan. It is, in fact, their very simplicity and availability to which is largely due their deplorable neglect and the failure to realize the wonderful benefits following their careful and continued observance.

Not only a healthy mental attitude toward life, but a healthy mental attitude toward one's own unhygienic habits is essential. It is a very common thing for a man to romance over his shortcomings, or his unhealthy physical conditions, to make humor of them to his friends. Very often the first step toward a better physical condition is a change in this mental attitude.

Section IV—The Possibilities of Hygiene

The report of the Roosevelt Conservation Commission on National Vitality, indicates that annually there are in the United States over 600,000 deaths which might be prevented if existing knowledge of hygiene were properly applied; that at least half of the 3,000,000 and more sick-beds constantly kept filled in the United States are unnecessary; that the financial loss from earnings cut off by preventable disease and premature death amounts to over $1,500,000,000 annually; and that over 15 years are lost to the average life through the lack of application of knowledge which al-

ready exists but which simply has not yet been disseminated and applied.

The health examinations of the Life Extension Institute have revealed unsuspected ailments in persons who considered themselves well, and to an extent which has astonished even those who have long been familiar with these subjects. Among large groups of clerks and employes of banks and commercial houses in New York City with an average age of 27 and all supposedly picked men and women, only 1 per cent. were found free of impairment or of habits of living inviting impairment. Of those with important physical impairments, 89 per cent. were, prior to the examination, unaware of impairment; 16 per cent. of the total number examined were affected with organic heart trouble, 42 per cent. with arterial changes, ranging from slight thickening to advanced arteriosclerosis, 26 per cent. with high or low blood pressure, 40 per cent. had sugar, casts, or albumin in the urine, 24 per cent. had a combination of urinary and other serious impairment, 47 per cent. had decayed teeth or infected gums, 31 per cent. had faulty vision uncorrected.

Among industrial groups, not exposed to any special occupational hazard or poisoning, the figures were as follows: With an average age of 33, none were found to be free of impairment or habits of living inviting impairment. Of those with important physical impairments, 89 per cent. were, prior to the examination, unaware of impairment; 3 per cent. of the total number examined were affected with organic heart trouble; 53 per cent. with arterial changes, ranging from slight thickening to advanced arteriosclerosis; 23 per cent. with high or low blood pressure; 45 per cent. had sugar, albumin or casts in their urine; 26 per cent. had a combination of urinary and other serious impairment; 69 per cent. had decayed teeth or infected gums; 41 per cent. had faulty vision uncorrected.

There are few persons in America to-day who reach the age of forty sound and normal in every part of the body, especially if we include among abnormalities the minor ailments. The extent to which minor ills are prevalent among those who pass for "well" people is not generally appreciated. Once we penetrate beneath

conventional acquaintance we almost invariably learn of some functional trouble, such as impairment of heart, circulation, liver, kidneys, stomach; or gallstones, constipation, diarrhea; or insomnia, neurasthenia, neuritis, neuralgia, sick-headache; or tonsilitis, bronchitis, hay fever, catarrh, grippe, colds, sore throat; or rupture, enlarged glands, skin eruptions; or rheumatism, lumbago, gout, obesity; or decayed teeth, baldness, deafness, eye ailments, spinal curvature, flat foot, lameness; or sundry other "troubles."

The draft examinations have recently given additional proof of these facts, fully substantiating the evidence supplied by the Life Extension Institute. There is impending a great awakening of the nation to the need of preventing such disabilities, and there is abundant hope that out of this destructive war there will arise higher ideals of health and physical fitness that will in a measure compensate for the terrible sacrifices of the nations.

Section V—The Fields of Hygiene

As soon as an individual becomes interested in caring for his own health

and for the health of his family, his interest will not cease at individual hygiene; he will wish to improve the efficiency of the public health service by increased appropriations, improved equipment and personnel; and to cooperate with the health officer.

Race hygiene or eugenics, which is the third and most important branch of hygiene, aims to conserve the health of *future* generations, through the action of those now living. Hygiene (individual and public) teaches us how to create for ourselves healthful conditions of living, but on every side we see evidences of the fact that we cannot entirely control conditions of health through hygiene only. Not all maladies by any means can be attributed to unnatural or unhygienic conditions of living. It is true that if followed out faithfully, the rules of hygiene will enable a man to live out his maximum natural life-span, with the maximum of well-being, and to run no risk of allowing any inherent weakness to be brought out. But some persons, even if they followed what is very nearly the normal code for the human being, would scarcely be able to avoid dire physical

and mental fates. In short, we find that besides the hygienic factor in life which we may call environment, there is something else on which the health of the individual depends. This something else is heredity, or "the nature of the breed." Back of all the individual can do by hygiene lies his inheritance. To change this the individual can do nothing, but the parents of the individual can affect his inheritance, and we as parents can affect the inheritance of our offspring.

First, we can carry through life uninjured the essential germ plasm which has been entrusted to our care. We should never forget that this germ plasm, which we receive and transmit, really belongs, not to us, but to the race; and that we have no right, through alcoholic or other unhygienic practises, to damage it; but that, on the contrary, we are under the most solemn obligation to keep it up to the highest level within our power. We are the trustees of the racial germ plasm that we carry.

Also it should be remembered that we can affect the life of our offspring by our choice in marriage. The basis of the development of desirable or un-

desirable tendencies or traits lies, of course, in the mating from which the individual springs. On the kind of combinations of germinal traits that are made by marriage depends whether or not undesirable traits shall reappear in the offspring. For instance, a man may inherit a defect from his father because his father married a certain type of woman. Had the father selected a different type, the children might not have inherited the father's defect. The importance of choice in marriage results from certain laws of inheritance, which make it clear that by proper combinations of individuals certain bad traits may be entirely "bred out."

As soon as men and women acquire the knowledge that their choices in marriage largely determine whether or not their physical and mental faults and virtues will reappear in children, they feel a sacred responsibility in that act of choosing. A little conscious knowledge of what kind of combinations of traits bring about their reappearance in offspring can not help but modify a person's taste, and thus automaticaly direct the choice of a mate, which choice will still be, and

rightfully, an instinctive one. Upon the wisdom with which choices in marriage are now made depends in large degree the health and efficiency of all the individuals who will constitute society in the coming generations. As the science of eugenics gathers a greater wealth of evidence and subjects it to vigorous analysis, its ability to guide the race to higher levels will become more positive and far-reaching. This can be done without surrendering the general principle of individual freedom. It will not reduce but increase the number of natural love-marriages. The errors of crude and superficial or overenthusiastic eugenists should not obscure the enormous possibilities of the science for the human race. Eugenic knowledge is, therefore, not only a personal advantage but a social necessity.

For society as a whole, a thoroughgoing eugenic program must include:

(1) The prevention of reproduction by the markedly unfit, such as the feeble-minded, by sterilization of the most unfit and by segregating the remainder in public institutions.

(2) The enactment of wise marriage laws.

(3) The development of an enlightened sentiment against improper marriages and the putting at the disposal of individuals contemplating marriage the data accumulated and principles worked out by eugenic students. The Eugenics Record Office of Cold Spring Harbor, Long Island, N. Y., is now engaged in collecting such material.

For us of the present generation, hygiene is of immediate concern; but if we are to build for future generations, hygiene must give way to or grow into eugenics. The accomplishment of a true eugenic program will be the crowning work of the health movement and the grandest service of science to the human race.